STATE OF DELAWARE
SINGLE POINT OF CONTACT – SPOC
INTERGOVERNMENTAL REVIEW OF FEDERAL PROGRAMS
Office of Management and Budget
Haslet Building, 3rd Floor, Dover, Delaware 19901
(302) 739-4206

Copy to Mike Hojnicki 11/2/09

1. STATE APPLICATION IDENTIFIER:	SPOC use ONLY	Month	Reviewer	CC's
S9-10-28-06		11	KR	K

2. Applicant Project Title: Delaware Health Information Network (DHIN) - ARRA

3. Applicant Department:	4. Applicant Division/APU:
DE Health & Social Service / Office of the Secretary/DE Health Care Commission	35-01-12

5. Applicant Address: Margaret O'Neill Bldg., 410 Federal Street, Suite 7, Dover, DE 19901

6. Contact Person:	7. Contact Person's Phone Number:
Paula K. Roy	(302) 739-2730

8. Signature of Secretary or Agency Head (for state agencies) or Chief Administrator (for all other applicants)

Paula K Roy

9. Federal Grantor Department:	10. Federal Sub-Agency:
Department of Health and Human Services (HHS)	Office of the National Coordinator for Health Information Technology (ONC)

11. Federal Contact Person:	12. Phone Number:
Chris Muir	(202) 205-0470

13. Address: Office of the National Coordinator for Health Information Technology
Department of Health and Human Services
200 Independence Avenue, S.W., Suite 729D
Washington, DC 20201

14. Federal Program Title:	15. FEDERAL CATALOG NO: (CFDA)
American Recovery and Reinvestment Act of 2009, State Grants to Promote Health Information Technology Planning and Implementation Projects	93 719

16. Project Description:

The purpose of this program is to continuously improve and expand HIE services over time to reach all health care providers in an effort to improve the quality and efficiency of health care.

17. Will funds be utilized for any technology initiatives? X Yes ☐ No If so, Business Case Number and brief project summary:

20071188_01_01

18. Measurable Objectives:
a. What were last year's objectives?

N/A

b. Were these objectives met? (if not, please explain why)

N/A

c. What are this year's objectives?

To improve communication among healthcare providers by providing access to the best available information at the time and place of care.

To improve the efficiency and value of electronic health records (EHR) in the physician office and to assist those physicians without an EHR to better organize and retrieve test results.

(If more space is needed, please attach a separate sheet of paper)

19. Grant Period:	20. How many years has this project been funded:	21. If the project was funded last year, how much federal money was awarded?
From: *January 15, 2010*	*N/A, new project*	*N/A*
To: *January 14, 2014*		

22. Source of funding for this application:	Dollars
a. Federal grant	*$4,680,284*
b. Other federal funds **(Specify source of funding)**	
c. Required state contribution **(Specify source of funding)**	*$278,079*
d. Discretionary state contribution **(Specify source of funding)**	
e. Required local contribution **(Specify source of funding)**	*$278,079*
f. Other non- federal funds **(Specify source of funding)**	
TOTAL	*$5,236,442*

23. Budget by cost category and source:	Federal Funds	State Funds	Other Funds	Total Funds
Salaries & Fringe Benefits				
Personal or Contractual Services	*$4,380,284*	*$278,079*	*$278,079*	*$4,936,442*
Travel				
Supplies & Materials	*$300,000*			*$300,000*
Capital Expenditures				
Audit Fees				
Indirect Costs				
Other				
TOTAL	*$4,680,284*	278,079	278,079	*$5,236,442*

24. How many positions are required for the project? (Exclude casual/seasonal employees)

Breakdown of position(s)	Authorized in State Budget	New Positions Required	Total
Paid for out of federal funds			
Paid for out of General Funds			
Paid for out of state special funds			

Paid for out of bond/local/other funds			
TOTAL			

25. PLEASE NOTE: On a separate piece of paper, please give position number, grade, yearly salary and percent of funding (federal, state, local, other) and the full-time equivalent for all positions required. Please identify the new positions by placing an asterisk before the position title. If this grant funds positions within other departments, divisions and/or offices, please list them. **If a position has been reallocated to or from another grant please indicate the grant source.**

Delaware Health Information Network
ARRA Application Summary

Name of Grant or Program: State Health Information Exchange (HIE) Cooperative Agreement

Opportunity Number: EP-HIT-09-001

Award Amount: Baseline awards are no less than $4.0 million. DHIN was authorized to apply for $4,680,284 over four years.

Division: Delaware Health & Social Services / Delaware Health Care Commission

Description: Project will allow DHIN to build statewide HIE functionality consistent with guidelines in a strategic plan from the federal Office of the National Coordinator for Health Information Technology (ONC). Planned functionality, the majority of which will be implemented within the first two years, includes: electronic eligibility and claims transactions, electronic prescribing and refill requests, electronic clinical laboratory ordering and results delivery, quality reporting capabilities, connection to Medicaid MMIS system, and clinical summary exchange for care coordination and patient engagement.

DHIN already has most of the application requirements in place, such as:

- A live, operational and sustainable health information exchange.
- Public-Private Board of Directors representing state and local needs.
    - DHIN statutorily and operationally meets this requirement.
- DHIN has been recognized by the Governor as the State Designated Entity for the State of Delaware, a requirement to apply for the grant.
- Richard Wadman (Department of Technology and Information) has been appointed the State's Health Information Technology Coordinator. This position is also requirement for application.
- A State plan consistent with the grant requirements (this plan was developed in 2005 and is being updated for the grant)
- Connectivity to the Division of Public Health for biosurveillance reporting.
- Authority to execute approved State Plan.
    - DHIN meets this requirement in that it has been the only statewide health information exchange (HIE) in the country; having gone live in 2007. DHIN is Delaware's only HIE in Delaware with more than 50% adoption of Delaware's health care providers and with participation from the majority of hospitals and labs. DHIN moves more than 40 million clinical transactions per year.

Submission: DHIN submitted a required Letter of Intent on 9/9/09 (due date was 9/11/09). DHIN prepared its grant application in collaboration with Medicaid, Public Health, Department of Technology and Information, Department of Corrections and the Department of Services for Children Youth and Their Families. The application was submitted on 10/16/09 (due date was 10/16/09).

Project Narrative

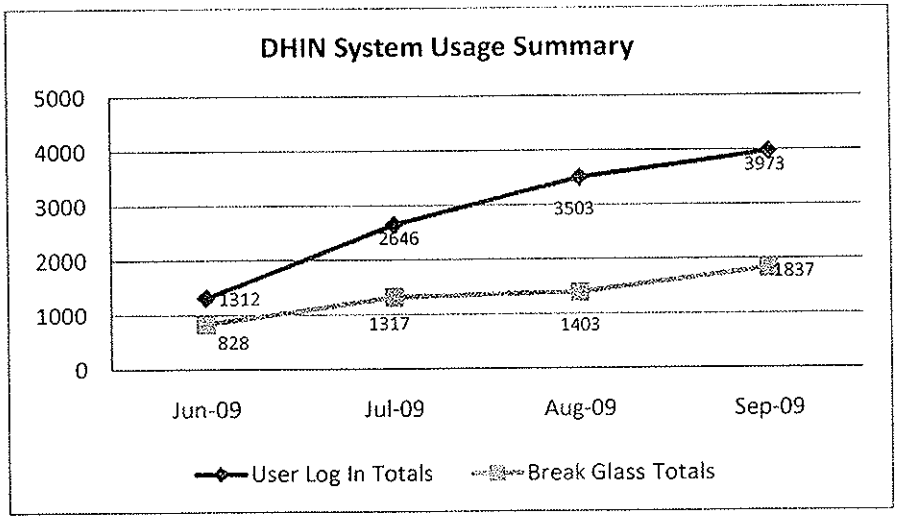
a) Current State

In 2007, Delaware became the first statewide operational, standardized, real-time, interoperable health information exchange, connecting hospitals, reference laboratories, and a wide variety of system users across the state, including physician practices, federally qualified health center, and public health. The Delaware Health Information Network (DHIN) originated by the Delaware General Assembly, which established the instrumentality in 1997. A public–private partnership, DHIN was given the mission of developing an electronic data interchange network to provide health care professionals across the state with immediate access to the most current patient information at the point of care.

DHIN has succeeded in crossing geographical and organizational boundaries to expedite the delivery of clinical test results to ordering physicians as well as any other provider with a relationship to that result (i.e. copy to, primary care, admitting and/or attending). Via the Delaware Health Care Commission (DHCC), DHIN contracted with technology firms Medicity, Inc. and Perot Systems in September 2006 to implement software solutions and maintain the technological infrastructure needed to ensure more timely delivery of laboratory and pathology results, imaging studies, and admission face sheets from three hospital systems and LabCorp. On March 30, 2007, DHIN went live with a technical pilot; and on May 1, 2007 the system was fully operational in five physician practices. On June 15, 2009, DHIN deployed a community master patient index and record locater service to enable patient record search of over two years of clinical history available through DHIN. Additionally, two new data senders went live: Quest Diagnostics and Doctors Pathology Services. A fourth hospital is expected to go live in early 2010.

As of September 30, 2009, 1198 providers either using the DHIN to receive their clinical results and to search for clinical history or who were in the process of enrolling in DHIN. Additionally, there are 1707 total users including providers and their staff. The following chart illustrates the increase in DHIN

usage since go-live of the patient record search function. The top line shows the number of patient searching occurring in the system and the bottom line illustrates the number of times an expanded search has occurred, giving the authorized user access to clinical results and reports ordered by other providers for a given patient.



In accordance with DHIN's privacy and security policies, DHIN monitors all patient record searches to ensure that the patient records are only accessed for clinical purposes. When a user is suspected of inappropriate use of the DHIN, their access is suspended and they are reported to the DHIN administrator at the user's place of employment. DHIN works with the employer to determine if the access was appropriate and both entities take proper disciplinary and/or legal action based on findings.

From a regional perspective, Delaware has had initial conversations with Maryland and Pennsylvania that may lead to a regional approach to health information exchange among Mid-Atlantic States. Through the State HIE Cooperative Agreement, these states (and possibly others) will work on cross-state exchange issues to further explore the feasibility and desirability of pursuing this alternative, to include:

- Review of State laws that impact health information exchange and determine their impact on cross-state information exchange.
- Explore options for a regional governance structure, such as an interstate compact.

- Explore the feasibility of implementing quality and/or population health reporting for the region and/or sub-regions to support federal and state programs, such as CMS, CDC, State Medicaid and public health.
- Define cross state policies with regard to access to patient-identifiable information for use by health professionals and public health agencies.

During the application process, DHIN evaluated the status of its existing strategic and operational plans using the AHIMA self-assessment and has determined that it has an existing strategic/operational plan that is consistent with planning guidance. DHIN's self-assessment is provided in Appendix A. DHIN's strategic/operational plan has been updated to reflect the current status of DHIN functionality and implementation plans and is submitted in Appendix B for review and approval by the National Coordinator.

DHIN was named the State Designated Entity for responding to the State HIE Cooperative Agreement program by Delaware Governor Jack Markell. The DHIN's September 9, 2009, letter of intent and the Governor's designation letter are provided in Appendix C.

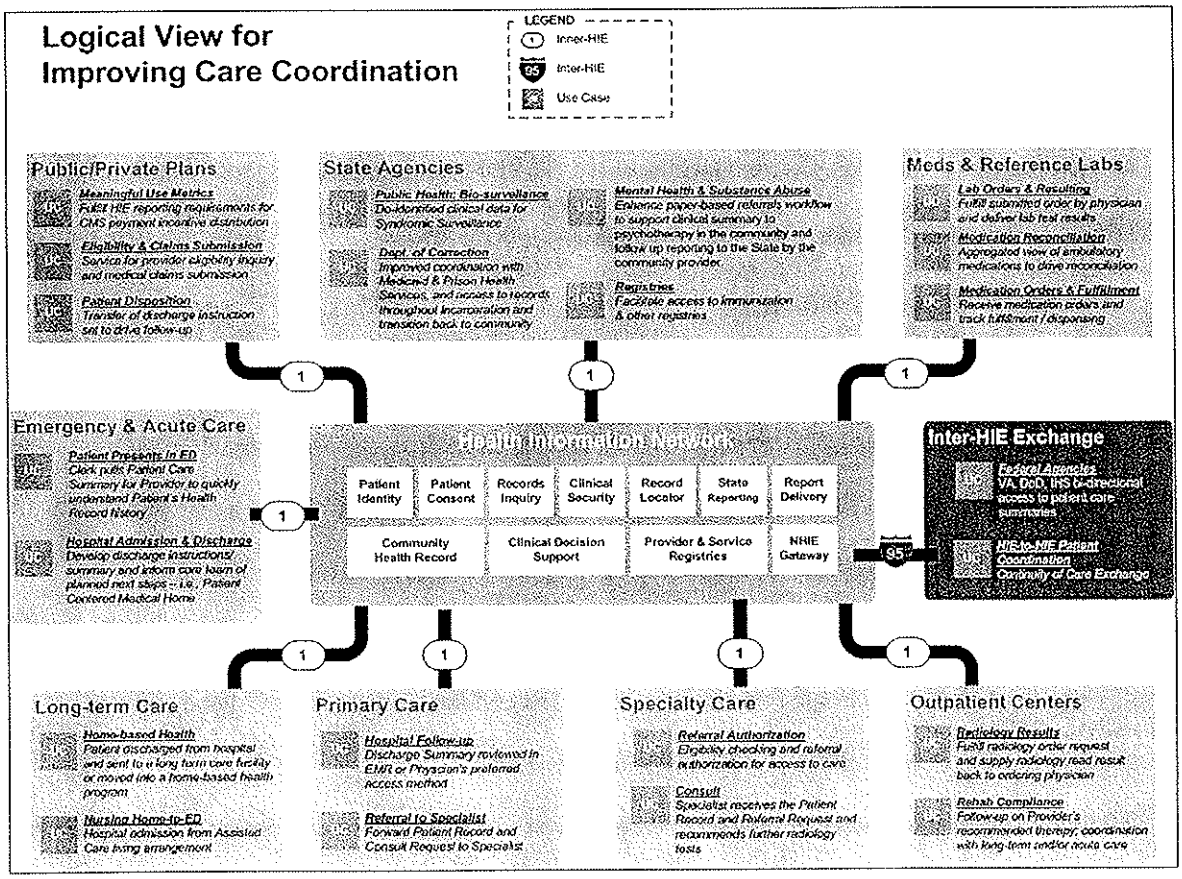
b) Proposed Project Summary

The DHIN is a fully operational HIE, including results delivery and patient record inquiry functions as described in the Current State section of this application. In early 2010, DHIN will go live with electronic order entry from EHR, transcribed reports, radiology images and EHR Primer. The EHR Primer will be offered to practices that do not have an EHR and who cannot afford, in the short-term, to make the significant financial and staffing/workflow change investment. The Primer will offer Calendar and Scheduling, Chart View, Electronic Prescribing, Orders Requisition, Secure Health Messaging, Correspondence, Custom Form Builder, and Security Permissions.

The following graphic describes the DHIN's approach to implementing the required functions of the State HIE Cooperative Agreement and ensuring a system of coordinated care. Much like the highway system in Delaware, the DHIN connects healthcare providers and other organizations in Delaware to provide for a direct and efficient route for clinical information. The result, a more cost-effective experience for the patient that results in better outcomes and quality of care. The diagram depicts how

DHIN will leverage Core Services to meet established use cases for improving care coordination within the DHIN. DHIN's Core Services are designed to: allow secure, roll-based access to clinical data; initiate or receive request to exchange clinical summary documents or discrete results; facilitate the ordering and referral requests from community physicians; and provide timely reporting and document exchange to State Agencies.

The following sections provide a description of the DHIN's implementation strategy for the use cases defined above and the requirements set forth in the Cooperative Agreement. Also in 2010, DHIN



will work with the Division of Public Health and the Division of Medicaid and Medical Assistance to define project scope for interfacing with the Immunization Registry, Public Health Laboratory, Newborn Screening Program and Medicaid Management Information System respectively. In 2011, DHIN will

focus on collaborating with other agencies and organizations that maintain information on health care providers in Delaware to develop a centralized directory of services and will work with Medicaid to define reporting requirements for meaningful use.

In 2012 and 2013, DHIN will build upon this foundation to implement claims process and eligibility verification for Medicaid and private payers. DHIN also will implement Scheduled Orders which will allow referring physicians to electronically order outpatient radiology procedures (MRI, CT, Ultrasound, Mammography, Plain Film Radiography, Nuclear Medicine, PET, PET/CT, Bone Densitometry, etc) to a radiology provider as well as other schedule-based orders such as Physical Therapy, Occupational Therapy, or Speech Pathology. This functionality will further expand DHIN's capacity to support coordination of care among all healthcare providers. Additionally, a quality reporting data mart will be established to support meaningful users in reporting quality measures at the practice level as well as at the community level through DHIN.

Electronic Eligibility and Claims Transactions

DHIN plans to support a variety of administrative transactions including eligibility verification and claims submission. Similar to other data aggregation approaches, DHIN offers a flexible implementation model designed to meet data providers at their current level of technology adoption. Therefore, data providers do not have to upgrade their systems in order to participate in the network.

DHIN's approach to administrative transactions intends to achieve the goal of simplifying provider and provider staff interaction with public and private payers across Delaware by optimizing access to administrative transactions, such as eligibility verification and claims submission, by creating a common payer framework where a variety of use types can interact with all payers statewide from a single user interface while maintaining unique payer branding as well as access to "members only" services which will drive adoption of payer-specific online services and information. This framework will be a new paradigm to enable these services to be integrated into the physician's or office staff's workflow which will streamline process and promote efficiencies. Aggregating payer-related activities streamlines the

workflow for physician offices and hospital staff while providing accurate, timely, secure response.

Features include:

- Eligibility verification – both batch and real-time transactions are supported
- Benefit Inquiry – verification of coverage, limitations, out-of-pocket maximums and requirements
- Claims Submission – single or batch processes
- Claims Status Inquiry – verify the status of a claim

Leveraging the technology already provided by the Medicaid Information Technology Architecture (MITA) framework and other health plans, combined with workflow-centric components provided by DHIN can reduce costs while driving adoption of member-specific services provided by the payer.

With regard to providing streamlined administrative processing, DHIN will act in the same manner it does with clinical transactions. That is, DHIN will receive an administrative transaction and transmit it to a selected clearinghouse to process the claim. DHIN plans to release a request for proposals to select the appropriate clearinghouse and to ensure the best rate from the clearinghouse for per-transaction reimbursement to DHIN for facilitating the transactions. With regard to eligibility verification, this will work in tandem with the DHIN query function or can be accessed directly via the office-based electronic medical record, which may be an important factor for demonstrating meaningful use. A query of a patient's clinical records will also return verification of eligibility for those providers who subscribe to this DHIN service.

Electronic Prescribing and Refill Requests

DHIN will provide electronic transmission of prescription and prescription related information (prescriptions, refills) through the EHR Primer to facilitate ePrescribing between a prescriber, dispenser, pharmacy benefit manager, and or health plan through the intermediary Sure Scripts-RxHub. Core features of the prescription writer include medications which are searchable by trade or generic name, diagnosis, and/or therapeutic category (Medication database is supported by Micromedex®). A commonly prescribed or favorites list can be configured by the provider. All prescribed medications

and/or refills will include dosage forms and strengths available, route, frequency, duration and quantity. Number of refills, dispense as written, prescribe PRN (as needed), directions and free text comments can be included in the prescription. All prescriptions include the prescriber signature. In addition, formulary and eligibility information are available to providers real time during the ePrescribing workflow. Clinical decision support is available via a drug reference guide (Micromedex®). Because the ePrescriber is fully integrated with the EHR Primer, up to date medications histories as well as patient specific clinical information can be accessed during the ePrescribing process for provision of clinical decision support. Alerts relative to drug interactions, allergies, pregnancy/lactation warnings, lab interactions, condition contraindications, age specific warnings, general precautions and duplication checking is available. Prescriptions can be generated in print form or can be faxed directly to an identified pharmacy (search function for pharmacies by state zip code), they can be transmitted electronically via Sure Scripts EDI (bi-directionally), and/or via an intermediary (health information exchange). The electronic prescriber adheres to all standards; description standards (e.g. NDC), transmission standards (e.g. NCPDP) and associated information standards (e.g. 270/271 eligibility).

The following meaningful use objectives are supported with this function: use CPOE for all orders; implement drug-drug, drug-allergy, drug-formulary checks; and generate and transmit permissible prescriptions electronically (ePrescribing).

In addition to ePrescribing and refill requests, DHIN is currently in the process of establishing a pilot project for medication history, which will be searchable from the DHIN provider portal. Delaware is able to offer a unique value proposition – to quickly distribute comprehensive, statewide medication history data by way of DHIN. This solution provides the added benefit of storing medication history affording participating stakeholders early and comprehensive availability of commercial and retail medication data while ensuring its end users experience exceptional response time when making inquiries to the system, and reducing the dependence on a fee-based query each time a DHIN patient is brought into focus via DHIN. DHIN can provide access to medication data for approximately 90 percent of the 'covered lives,' in Delaware. Medication history sources currently include SureScripts, Pharmacies and

PBMs and will ultimately include Medicaid via a direct connection to the MMS and Medicare. Additionally, given that more than 75 percent of Medicaid recipients in Delaware are covered by managed care organizations – Aetna Health, Inc. and United Healthcare Insurance Co. – it is important to note that these medications will be available prior to the MMIS integration since these companies already provide data to the DHIN medication history. Other participating health plans include: Blue Cross Blue Shield of Delaware, Inc., National Union Fire Insurance of Pittsburgh, Coventry Health Care of Delaware, American Home Assurance, PacifiCare Life & Health Insurance, Optimum Choice, Hartford Life & Accident Insurance, Metropolitan Life Insurance, AIG Life Insurance, Aetna Life Insurance, Hartford Life Insurance, AmeriHealth HMO, Inc., and Humana Insurance.

Electronic Clinical Laboratory Ordering and Results Delivery

Orders requisition will be an available function offered by the DHIN in early 2010 through EHR Primer as well as through a traditional EHR connected with a bi-directional interface with DHIN. For the EHR Primer, providers will have the ability to create order requisitions which can be printed or faxed to a desired performing department. Providers can configure and create a favorites list of orders. Orders for performing departments include laboratory, radiology and clinician orders. Lab order requisition information includes test name, lab name, test code, lab code. Lab orders can be linked to a specific problem/ICD9 code. Clinical laboratory results will populate the EHR Primer via the DHIN.

DHIN is currently working with Allscripts to develop a pilot project whereby the lab orders process through DHIN is tested before it is fully deployed to all DHIN users. The pilot will evaluate workflow changes and improvements from the perspective of both the ordering provider and the receiving laboratory.

With regard to laboratory results delivery, since 2007, DHIN has been facilitating the electronic transmission of lab results from three hospital systems and LabCorp; and in 2009 Quest and Doctors Pathology Services were added. All of these lab providers send DHIN lab results in real

time as they are completed in the laboratory information system.

In addition to electronic laboratory orders, DHIN will implement Scheduled Orders which allows referring physicians to electronically order outpatient radiology procedures (MRI, CT, Ultrasound, Mammography, Plain Film Radiography, Nuclear Medicine, PET, PET/CT, Bone Densitometry, etc) to an imaging center or the radiology department of a hospital; or for other schedule-based orders such as Occupational Therapy, Physical Therapy, or Speech Pathology orders. The orders are transmitted to a scheduling work queue where the information is reviewed for clinical completeness. A messaging system between the physician practice and the scheduling department facilitates communicate when there is missing clinical information or incomplete insurance authorization. When the procedure(s) is scheduled in the performing system's scheduling system, an electronic update of the scheduled date and time presents to the physician's practice, where upon they can notify the patient. If the imaging facility contacts the patient, it is duly noted so that the physician clinic is aware. The Scheduled Order is completed when the patient presents for the procedure. The practice has the ability to filter and find the patients who have not yet had their scheduled procedure completed. Clinical Results received from the Performing Laboratory will be delivered to the Physician and/or Practice using the DHIN data distribution model.

DHIN currently delivers radiology reports through the network and is in the process of adding links to these reports, which will interface with the imaging system at the source system, giving providers the capability to view diagnostic quality images from the DHIN portal.

Today, over 510,000 laboratory and radiology transactions are being delivered through DHIN each month.

Electronic Public Health Reporting

In 2008, DHIN went live with reporting of chief complaint data from hospital emergency departments (ED) to the State's public health biosurveillance system – the Delaware Electronic Reporting and Surveillance System (DERSS). This functionality also was demonstrated at the NHIN Forum in

December 2008 as part of the biosurveillance use case. Via the emergency department admission (ADT transaction), DHIN receives the chief complaint for the patients visit to the ED and routes it to the patients provider as well as to the DERSS system in real-time standardized format. Public Health pseudonyminizes the data and imports it into the DERSS system nightly in batch.

DHIN is currently in test with DERSS on lab reporting from hospitals for reportable diseases. This works much the same as the ED chief complaint data feed to public health; however, only lab results flagged by the laboratory's interface is delivered to DERSS.

In 2008, DHIN began discussions with the Delaware Division of Public Health (DPH) on connecting the State's immunizations registry with DHIN. This discussion was put on hold while DHIN worked with State information technology leaders to establish a plan for participation in DHIN by all state agencies. These discussions were completed in September 2009 at which time DHIN resumed discussions with DPH on connecting the registry and reporting immunization administration to DPH. This process will continue as a full set of scope requirements are defined; at which time implementation will begin on connecting DHIN with the immunization registry for by-directional electronic reporting through DHIN.

Quality Reporting Capabilities

The DHIN quality initiative is built on the strong foundation laid over the last several years. Starting with comprehensive data acquisition services, DHIN receives 40 million transactions per year and contains nearly 650,000 unique patient records (for perspective, Delaware's population is approximately 875,000). In 2010, DHIN will work with the Federally Quality Health Center Network in Delaware to realize a grant that was recently awarded. The project will establish an interface to the FQHC network of three health centers in order for DHIN to receive problem lists, medications and allergies from the EHR. Additionally, as EHR adoption and meaningful use criteria are realized, DHIN will add other EHR vendors as data contributors to the network. This vast amount of patient records, clinical results and uniquely identified physicians is an essential foundation for a strong quality reporting

environment.

This year DHIN will leverage the foundational data stores by providing quality of care reports and analytic tools. Quality reports include the ability to generate reports and distribute information to key stakeholders including physicians and physician groups, de-identified reports to health plans and hospitals, and population reports to public health. Quality reports can be stratified by gender, age, health plan, ethnicity and include:

1. % diabetic with A1c under control and % diabetic with A1c out of control
2. % Patients with LDL under control
3. % eligible surgical patients who received VTE prophylaxis
4. % order for medications, lab test,
5. % of medications entered (ordered) as generic when a generic equivalent is available
6. 30 day readmission rate
7. Gap in care reports based on practice guidelines (patients with CHF not currently on an ace inhibitor)
8. % reportable lab results submitted electronically
9. Report up-to-date childhood immunization rates
10. Active Health Care Considerations

In addition to the quality reports, which can be published regularly to targeted physicians and physician groups, DHIN will provide a module available to authorized users supporting the ability to notify, track, and to act on the quality outliers. Using an Internet-based tool, users can generate patient lists with key identifiers, and initiate follow-up care. Additionally, this feedback loop allows the ordering physician to identify patients that should either be "excluded" from the population (i.e. snow bird patient that has returned to primary care physician) and to add patients that had been wrongly excluded. This process of patient list management, follow-up notification and tracking, and refining PCP responsibility builds accuracy and credibility into the process.

In 2010, DHIN will begin a pilot project with Active Health to support the delivery of Care Considerations to DHIN providers. These reports will be sent to DHIN by Active Health whereby DHIN will deliver the information to the intended provider(s). The pilot project will be the first step toward clinical decision support activities and will include a subset of the Medicaid population managed by Medicaid managed care organization Delaware Physicians Care, Inc. Finally, providing a mechanism to

account for quality improvement, DHIN can deliver pay for performance, physician utilization, HEDIS data, and population trends.

Clinical Summary Exchange for Care Coordination and Patient Engagement

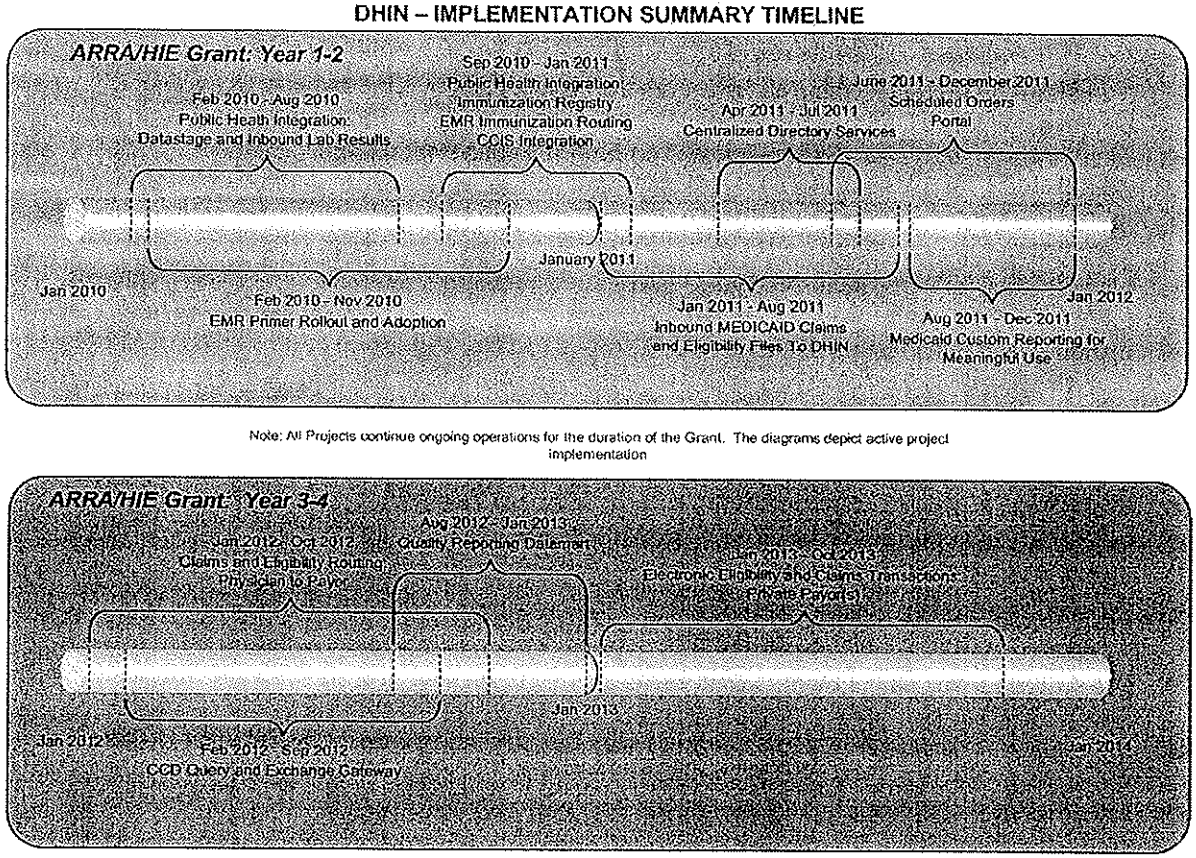
DHIN demonstrated the query, exchange and viewing of a clinical summary using the HITSP Continuity of Care Document (CCD) standard for the NHIN trail implementation in September 2008, whereby the CCD was implemented using test data in a demonstration environment. This demonstrated functionality is especially useful for the exchange of discreet clinical data such as lab results, other clinical results, medications, radiology reports as well as chart abstracts in the case of a user who is not yet enrolled in the network. Within the DHIN network the following CCD exchange services will be offered:

1. EMR CCD Exchange – as EMRs are able to support sending CCD documents to DHIN, DHIN will make this information available to the network.
2. HL7-to-CCD Exchange – for those data providers that cannot yet support the HITSP standard, the DHIN conversion services will receive data in a nonstandard format (typically HL7), and will convert it into a CCD format in order to make it available by other systems and queries.
3. CCD Exchange for Referral and Consult – to support for coordination of care among State mental health services for adults and children, the CCD will be used to facilitate the referral processes used to integrate the patient into community-based service providers.
4. CCD Aggregation Services – to support Social Security Administration workman compensation and disability claims, the DHIN has the ability to provide aggregated CCD records and can also serve as a single pipe for any CCD record; thus reducing the number of connections to individual organization and increasing the turn-around time for clinical information needed to support such claims.
5. CCD to HL7 Document Exchange — for recipients of data that are not able to support the consumption of inbound CCD document, such as public health or other registries, DHIN can translate CCD data into HL7.
6. Personal Health Records (PHR) and Health Record Bank integration – supporting a CCD or aggregated CCD for distribution to PHRs and health record banks will promote the meaningful use requirement for consumer engagement

Project Plan

The diagram on the following page illustrates DHIN's timeline to implementing the functionality described above:

DHIN – IMPLEMENTATION SUMMARY TIMELINE



Note: All Projects continue ongoing operations for the duration of the Grant. The diagrams depict active project implementation

DHIN's approach to managing the proposed timeline will follow the project management methodology it has had in place since 2006. This approach is a primary reason for DHIN's success to date. It relies heavily on the work of the Project Management Committee, which provides day-to-day input and guidance on project management, implementation and testing processes for DHIN. The Committee is comprised of project managers from all of the data contributing organizations, the DHIN technology vendor, the DHIN project manager and the DHIN management analyst. Members ensure that their respective organizations are appropriately represented at various stages of the implementation process, including interface coding and maintenance, testing, data standardization, monitoring. Committee members coordinate with the necessary business units within their organizations to ensure buy-in and commitment at all levels. Additionally, this Committee provides guidance for planning future functions, makes change requests, and ensures technical resources are appropriately dedicated to the

project and that their systems are positioned for DHIN connectivity. The Committee makes recommendations to DHIN leadership and monitors the project plan/timeline and oversees resource management to ensure the project is implemented on time and consistent with specifications.

An important focus of the Committee is to identify and mitigate risks associated with meeting the project plan/timeline, implementation and go-live issues, data integrity, interface and database changes, system upgrades, and other factors that may affect DHIN's success. All issues are discussed in an open forum via Committee meetings and are addressed based on a consensus approach. The Project Management Committee meets weekly for up to two hours by teleconference and web conference (when needed) and meets each month in person for a four-hour period.

Privacy and Security

As set forth in the DHIN Statute, DHIN shall by rule or regulation ensure that patient specific health information be disclosed only in accordance with the patient's consent or best interest to those having a need to know. The health information and data of the DHIN is not subject to the Freedom of Information Act, Chapter 100 of Title 29, nor to subpoena by any court. Such information may only be disclosed by consent of the patient or in accordance with the Delaware Health Care Commission's rules, regulations or orders.

Any violation of the Commission's rules or regulations regarding access or misuse of the DHIN health information or data shall be reported to the office of the Attorney General, and subject to prosecution and penalties under the Delaware Criminal Code or federal law. (71 Del. Laws, c. 177, § 1.)

With the assistance of DHIN's hospitals, privacy officers, legal counsel and Consumer Advisory Committee, DHIN has established a policy that considers individuals' rights and expectations, while balancing the need for health care providers to have information that enables them to make informed decisions and ultimately provide better quality health care services. DHIN's privacy policy and procedures incorporate the privacy and security provisions of the ARRA, HIPAA Privacy Rule, HIPAA Security Rule, Confidentiality of Alcohol and Drug Abuse Patient Records Regulations, and the HHS

Privacy and Security Framework.

DHIN's Access to Individually Identifiable Health Information Policy is applicable to all users and data contributing organizations of DHIN. All users, senders and receivers of data, have signed and agreed to the DHIN Data Use Agreement. This policy does not supersede or replace any Health Insurance Portability and Accountability Act (HIPAA) privacy or security policies in use by individual DHIN users and data contributing organizations.

DHIN logs all system activity, including: user log-in identification, user name, user organization, date and time, patient account that was accessed, and type of records viewed by user. DHIN has established procedures to monitor access to individually identifiable health information on a regular and scheduled basis to ensure appropriate use of the system. In consultation with the State's High Tech Crime Unit and Attorney General's Office, procedures have been developed to report and address misuse and/or breaches of the system.

DHIN patient/consumer information is not sold or disclosed for any activity that may support marketing to the individual nor is individual information provided and/or used for mailing lists.

DHIN will continue to actively monitor ONC activity and guidance related to privacy and security, and will revise policies as necessary in order to maintain compliance with federal requirements.

Communications Strategy

DHIN's current infrastructure provides for comprehensive stakeholder involvement, cross pollination of members among DHIN committees and workgroups to ensure all organizations and stakeholders are well-informed of DHIN activities and progress. DHIN Board Directors chair the Executive Committee, Consumer Advisory Committee, Project Management Committee, Finance Workgroup and Governance Committee. These committees report at each Board meeting and updates on project status and issues are reported at each Executive Committee meeting. The HIMS Committee, the Continuum of Care Workgroup, and the Lab Standardization Committee report to the Project Management Committee. The Clinical Advisory Group provides input to DHIN staff who report to the

Executive Committee and Board of Directors. Furthermore, an electronic newsletter is published at least quarterly and is widely distributed to all DHIN users and stakeholders. A "splash page" on the DHIN secured portal is used to communicate important system and policy changes, updates and planned downtime to DHIN users. Additionally, the DHIN public website is used to update the general public on DHIN progress and status. These committees will be responsible for various aspects of implanting the projects associated with the State HIE Cooperative Agreement and the noted communications vehicles will be used to announce changes and the progress of new functionality.

Community - Stakeholder Involvement

DHIN demonstrates its commitment to serving the public good by seeking consumer input into the development, implementation and operations of DHIN through a Consumer Advisory Committee. This committee guides the development and implementation of policies with respect to privacy, functionality, and consumer education.

DHIN also has a Continuum of Care Workgroup (Long-Term Care and Home Health) whose purpose is to determine how DHIN can support patient care along the health care continuum and to identify potential processes that enable the use of DHIN to facilitate communication of critical patient data as patients make transitions between hospitals, long term care, rehabilitation centers and home health care. Committee membership includes representatives from hospitals, home health agencies, long term care agencies and regulatory agency leadership.

All of the state's four Federally Qualified Health Centers are live participants in the health information exchange. The FQHCs provide significant amounts of care to low-income, medically underserved populations. Two of them in particular, Westside Family Healthcare in Wilmington, and La Red Health Center in Georgetown, serve a majority of minority patients and those with limited English proficiency.

Health Care Providers: The Clinical Advisory Group (CAG) provides a forum for clinical and administrative staff from DHIN user organizations to advise on use of the system, improvements and

additions they recommend. This Group works in collaboration with the Consumer Advisory Committee to make privacy and security policy recommendations to the Board of Directors as indicated. Additionally, the CAG assists DHIN in addressing issues and barriers to the adoption of DHIN for practices across the state as well as reviews and makes recommendations on materials developed to educate and support DHIN users. CAG membership is comprised of physicians and practice administrators from private practices, Federally Qualified Health Centers and hospitals. The CAG is staffed by the Provider Relations Team and supported by the DHIN's technology partner, Medicity. Additionally, the DHIN Board of Directors is comprised of providers, who represent private practice physicians and hospitals. Health care providers also are represented on the following DHIN Workgroups: Continuum of Care, Emergency Access, Governance, and Finance.

Health Plans: By statute, the DHIN Board of Directors includes representation from up to three health plans. Currently, these positions are filled by Blue Cross Blue Shield of Delaware and Delaware Physicians Care, Inc., a wholly owned subsidiary of Aetna Health, Inc. In addition, health plans are represented on the DHIN Executive Committee and Governance and Finance Workgroups.

Patient or Consumer Organizations: The Consumer Advisory Committee (CAC), created in 2004, was one of the first DHIN Committees formed because DHIN leadership recognized the need to include consumers in the design and policy development of the HIE. The CAC offers input to the DHIN development, planning and implementation process. The group has met regularly since its inception, focusing primarily on policies related to privacy and security, and marketing and education activities for consumers. The group developed the framework for the DHIN privacy policy and procedures, which were approved by the Board of Directors and have been implemented by DHIN staff, and is supported by the technology. Additionally, the group has worked on marketing and educational materials for use in promoting DHIN. CAC membership is comprised of representatives from the Mental Health Association of Delaware, the National Alliance for Mental Illness, AARP, State Council for Persons with Disabilities, faith based organizations, family caretakers, Federally Qualified Health Centers, public health clinics, consumer health library services, and users of the health care system.

Health Care Purchasers and Employers: The Delaware State Chamber of Commerce is represented on the DHIN Board of Directors by statute. The Chamber representative also is a member of the DHIN Executive Committee and chairs the DHIN Governance Workgroup. The DHIN Board traditionally has had representation from two large employers; however, these seats are currently vacant and are in the process of being filled.

Public Health: The Division of Public Health (DPH) is represented on the DHIN Board of Directors as well as on the DHIN Consumer Advisory Committee. Upon implementation work for connectivity to the public health lab and immunization registry, DPH also will be invited to participate in the Project Management Committee.

Health Information Technology Vendors: The DHIN's technology partners – Medicity and Perot Systems – participate in all technical meetings of the DHIN. Medicity facilitates the Project Management Committee meetings and is a member of the HIMS and Lab Standardization Committee. They also attend CAC and CAG meeting. All meetings of the DHIN are open to the public and from time to time, other technology vendors participate in meetings.

Health Professions Schools, Universities and Colleges; and Clinical Researchers: The Evaluation Steering Committee is comprised of researchers and academia. It is chaired by the Director of the Center for Applied Demography and Survey Research at the University of Delaware, who also is the DHIN Vice Chair; the Director of Medical Informatics at Christiana Care Health System, who is a DHIN Board member; and the Director of the Centers for Outcomes Research at Christiana Care Health System. The mission of the Evaluation Committee is to provide guidance and expertise to DHIN and its contractors in the development, execution and reporting of DHIN's evaluation plan.

Other users of health information technology: The DHIN Continuum of Care Workgroup is comprised of representatives from hospitals, home health agencies, long term care facilities and regulatory agency leadership. The Emergency Access Workgroup is an ad hoc group of emergency medical providers that meets as needed to provide guidance to DHIN with regard to developing solutions for emergency services, medication history, and access rights for emergency providers. Additionally, DHIN is a member

of the Delaware Medical Group Managers Association and frequently interacts with this group to provide education and obtain input and feedback.

Governance

The DHIN was created through Delaware legislation in 1997 to "...promote the design, implementation, operation and maintenance of facilities for public and private use of health care information in the state..." DHIN's original enabling legislation (Delaware Code Title 16, Part XI, Chapter 99, Subchapter 9922) details the Powers and Duties of this public-private partnership: "Develop a community-based health information network to facilitate communication of patient clinical and financial information..."

The Public-Private Board of Directors is comprised of diverse organizations all representing the primary stakeholders of health information exchange. The Board composition is comprised of approximately 30 percent of directors representing the public sector and 70 percent of directors representing the private sector. They include representatives from the following constituency groups, organizations and agencies

1. Consumers: non-affiliated consumer representation
2. Providers: Delaware Healthcare Association (3 members representing hospitals) and the Medical Society of Delaware (3 members representing physicians)
3. Payers: Blue Cross Blue Shield of Delaware and Delaware Physicians Care, Inc., a wholly owned subsidiary of Aetna
4. Public: Delaware State government agencies, including Delaware Health Care Commission, Department of Insurance, Department of Technology and Information, Division of Medicaid and Medical Assistance, Division of Public Health, Office of Management and Budget
5. Employers: Delaware State Chamber of Commerce
6. Researchers: University of Delaware

An Executive Director oversees the day-to-day operations of the project with support from staff and guidance from the DHIN Executive Committee as well as advisory committees and ad-hoc workgroups who steer the project and ensure input and buy-in from all stakeholder groups.

Financial Accountability

The DHIN is funded by Federal contracts and State appropriations matched with private sector

fees and contributions. To date, these funding sources have been distributed relatively evenly at approximately one-third of DHIN's funding from each source.

Since its inception, DHIN has leveraged financial management personnel, policies and procedures within State Government to ensure proper budget management as well as authorization and payment of all DHIN accounts payable. These staff resources maintain DHIN's asset account and appropriated funds accounts and work with Federal, State, and private agencies to ensure that proper deposits, payments, and reimbursements are made. DHIN's asset accounts and invoice authorization are subject to monitoring and auditing requirements of the Office of Management and Budget for the State of Delaware.

DHIN is currently developing a long-term governance and sustainability plan and has elected a Board Finance Workgroup to develop financial statements, policies, and procedures as well as a long-term sustainability model. In February, 2009 DHIN hired a Finance Manager to provide expertise in developing budgets and creating financial reporting. DHIN's Finance Manager has developed holistic financial statements, which show the sources and uses of DHIN's funds to provide optimum transparency to DHIN's stakeholders. This reporting will be distributed quarterly to DHIN's Board of Directors. DHIN will provide ample reporting of its financial statements and of its expenses related to this award to an auditor, and will have an annual audit which fulfills the reporting requirements of the Single Audit requirements of the Federal OMB.

The Finance Workgroup is currently defining its long-term sustainability model. As DHIN has moved from a results delivery system (or push model) to a patient record inquiry system (or pull model), the beneficiaries of the system have expanded to include payers of health care. DHIN is currently in negotiations with the major health plans covering Delaware to define a payment structure that will include health plans as well as large, self-insured employers. The model may include a per member per month fee structure that will change as the benefits to the payer increase. By bringing in a more diverse membership and fee structure, the cost to the data senders will decrease; thus leveling the investment across multiple healthcare sectors.

DHIN also is working with the State of Delaware to change the financing from the State's capital budget to its operating budget by showing cost savings and reallocation derived from a more efficient way of doing business for many of their divisions and departments, including: public health, Medicaid, employee benefits, correctional health, and substance abuse and mental health.
Additionally, DHIN will be implementing over the next year, added value services for physician offices and in later years, services for consumers. These services may have fees associated with them for those who choose to participate in them.

DHIN has a history of providing required reporting to Federal Agencies. DHIN provides monthly expense reporting to the Office of the National Coordinator for the Nationwide Health Information Network (NHIN) in support of its Option Year 1 contract, and provides semi-annual reporting to the Agency for Healthcare Research and Quality (AHRQ) for its five-year grant that commenced in 2005.

c) Required Performance Measures and Reporting

Reporting Requirements

DHIN is in the process of implementing an evaluation plan that will measure success in terms of improving health quality, efficiency and cost. This evaluation activity also will include measures required by the State HIE Cooperative Agreement. In addition, the DHIN will work with partners across Delaware

to obtain baseline data of healthcare providers in the State and their current use of health information technology (HIT). This data will be compared with data derived from the DHIN management reporting data mart. Factors associated with reporting meaningful use of HIT will be defined in collaboration with Delaware Medicaid.

Governance

The Delaware Health Information Network is a statewide health information organization – the only such entity in Delaware. DHIN is managed and operated by a Board of Directors consisting of at least 13 and not more than 21 members. Board members are appointed by the following organizations to reflect the public-private and diverse nature of the DHIN: Delaware Health Care Commission (consumer and business appointees), Delaware health insurers (Aetna and Blue Cross of Delaware), Delaware Healthcare Association (represented by three hospitals), Medical Society of Delaware (represented by the Executive Director and two private practice physicians), Delaware State Chamber of Commerce, State Budget Director, Insurance Commissioner, Secretary of Health and Social Services, Division of Public Health, Department of Technology & Information. The Board is comprised of 11 private members and five (5) public members; reflecting a distribution of 69 percent private sector and 31 percent public representatives. An additional three (3) private sector members are in the process of being appointed by the Delaware Health Care Commission.

In 2005, the DHIN Board of Directors, through an appointed Technical Committee, completed a strategic plan in which an environmental analysis was conducted to understand the needs and wants of the medical community with regard to health information exchange. The process included the development of a functional requirements document and an architecture document, which are consistent with the requirements of the State HIE Cooperative Agreement project. These products were the basis for a request for proposal to secure a technical vendor to support the development and implementation of the DHIN. A contract was let in September 2006 and DHIN went live in March 2007 in a pilot demonstration, with a full go-live occurring on May 1, 2007. The strategic plan in updated annually to reflect the current needs of DHIN stakeholders and available funding to support the projects. The plan

was fully revised in September 2009 to reflect the requirements of the State HIE Cooperative Agreement.

The DHIN is required to follow open meeting laws as established by Title 29 State Government General Regulations for State Agencies; Chapter 100 Freedom of Information Act § 10004 Open meetings; which states that every meeting of all public bodies shall be open to the public except those closed pursuant to executive session purposes as defined in the statute.

Finance

Since its inception, and as an entity of the State of Delaware, the DHIN has leveraged financial management personnel, policies and procedures of the State to ensure proper budget management as well as authorization and payment of all DHIN accounts payable. These staff resources maintain DHIN's asset account and appropriated funds accounts and work with Federal, State, and private agencies to ensure that proper deposits, payments, and reimbursements are made. DHIN's asset accounts and invoice authorization are subject to monitoring and auditing requirements of the Office of Management and Budget for the State of Delaware. Additionally, the DHIN is currently undergoing an audit by the State Auditor's Office, to establish that it is maintaining all required financial statements and is adhering to State of Delaware financial management policies and procedures. The audit will be completed by December 2009.

The DHIN is funded by State appropriations matched with private sector fees and contributions as well as Federal funding in the form contracts with the Agency for Healthcare Research and Quality and the Office of the National Coordinator (Nationwide Health Information Network). To date, these funding sources have been distributed relatively evenly at approximately one-third of DHIN's funding from each source. The State-Private cooperative support of DHIN is strong and the benefits to these organizations are being recognized through greater efficiencies and user satisfaction. Additionally, the State of Delaware's commitment to DHIN is exemplified by State Agency participation on the Board of Directors as well as public health connectivity and work toward connectivity of other key programs and systems, including mental health, corrections, and Medicaid.

In 2006, DHIN developed a business model for its capital funding phase. This included State

funding derived from the Bond (capital) budget, which had a required dollar-for-dollar match of private sector funding. DHIN employed transaction fees as a percentage of total transactions delivered to DHIN by data sender organizations to secure the private sector match. The transaction fees account for 95 percent of the private sector share of the cost. The remaining 4 percent of private funds has come in the form of charitable contributions from Blue Cross Blue Shield of Delaware.

As DHIN finalizes its capital phase, a newly formed Finance and Sustainability Workgroup of the DHIN Board is currently developing a long-term sustainability model to become effective in State fiscal year 2010. The Workgroup is defining a broader, more diverse approach to sustainability now that all foundational functionality of the system has completed implemented. The Workgroup is looking at a variety of funding options including: transaction fees for data senders, fees based on adjusted discharges or staffed bed volumes, subscription fees for value-added services (e.g. EHR Primer, Medication History, Quality Reporting, etc.), Per Member Per Month (PMPM), reimbursement to provider for use of HIE and payment from provider to HIE, Per Employee Per Month, and/or one-time set up fee when initially connecting with the HIE.

The Executive Committee of the Board of Directors reviews the DHIN budget at least quarterly. The DHIN Board of Directors reviews the budget annually. However, at the June 2009 Board of Directors meeting it was decided that the Board would review the budget at each quarterly meeting. The DHIN Finance and Sustainability Workgroup is in the process of developing new reporting policies and procedures for DHIN to support financial management and sustainability. As the DHINs financing mechanisms become more complex, more specific reporting and financial management procedures will be needed.

Technical Infrastructure

The DHIN system went live in May 2007 on a statewide basis with results delivery from three hospital systems (five hospitals) and LabCorp. Results include laboratory test results, pathology results, radiology reports and admission, discharge and transfer face sheets (including patient demographics, chief complaint and guarantor information). In 2009, the DHIN added two new data senders – Quest

Diagnostics and Doctors Pathology Services as well as new functions, including the master patient index and record locator service facilitating the user's access to query the DHIN for historical data on a patient for which they have a need to know. The system was also enhanced to provide great flexibility to users with regard to preferences for results delivery. DHIN has connectivity to six electronic health record (EHR) vendors and five more are in the contract negotiations state with DHIN. DHIN utilizes is community purchasing power to negotiate discounted interface rates with EHR vendors, which are passed along to EHR customers in Delaware. Currently 26 practices ad 192 providers have direct EHR connectivity with DHIN.

The DHIN does not connect to other HIEs at this time as it is the only one in Delaware. However, DHIN is working closely with its neighboring states to seek opportunities for integration that support cross-state data sharing. Within the State of Delaware, 44 percent of Delaware's licensed health care providers (MD, DO, PA, NP) are receiving clinical data through the DHIN. Another 36 practices are in the process of enrolling in DHIN, accounting for approximately 80 health care providers. Additionally, it is estimated that 85 percent of hospitalizations and 90 percent of laboratory tests performed in Delaware are being delivered through the DHIN.

According to a survey conducted by the University of Delaware, the use of technology in physician practices has increased during a two year period between 2006 and 2008, and the use of electronic medical records has increased the greatest at a rate of 15 percent for primary care providers and 8 percent for specialists. In 2008, nearly 50 percent of Delaware physicians report using an electronic medical record. It should be noted, however, that the survey does not define electronic medical records. As a result, this number may be exaggerated. Access to electronic lab and radiology results also has significantly increased for primary care providers—a rate increase of 19 percent over the two-year period.

The DHIN and the Division of Medicaid and Medical Assistance (DMMA) are working collaboratively to support Medicaid data becoming available through DHIN and DHIN supporting reporting of meaningful use criteria. Specifically, Medicaid will provide DHIN with reoccurring claim, eligibility, and provider data interfaces according to the DHIN specifications. The design, testing, and

implementation will take approximately three months. DMMA uses MOVEit® DMZ to safely and securely collect, manage, store, and distribute sensitive Medicaid information to external entities such as DHIN. Web browsers and secure FTP clients can quickly and securely exchange files with MOVEit® DMZ over encrypted connections using the HTTP over SSL (https), FTP over SSL (ftps) and FTP over SSH (sftp) protocols. All files received by MOVEit® DMZ are securely stored using FIPS 140-2 validated AES encryption, the U.S. Federal and Canadian government encryption standard. Requirements definition for reporting meaningful by DHIN to Medicaid use is underway.

Business and Technical Operations

Because the DHIN is the only HIE in Delaware and it covers health care providers statewide, there has not been a need to provide technical assistance for HIE development. As such, DHIN's planning, monitoring and remediation processes occurs within the governance structure of the HIE, through committees and workgroups. For example, the DHIN Project Management Committee identifies risks and establishes remediation plans that address those risks – this process includes gaining consensus among all data sender organizations and uniformly applying remediation activities within and across these organizations and the DHIN system.

Delaware was recently awarded a grant to enhance broadband access across the state. This grant will provide the opportunity to assess the current broadband coverage in Delaware and address gaps in service. While this data is not available at this time, Verizon recently completed a statewide expansion of its broadband coverage. As a result, it is estimated that only small pockets of Kent and Sussex Counties in southern Delaware remain without broadband access. Broadband access is a basic requirement for using DHIN.

Because DHIN is the only HIE in the State and services providers statewide, the entire system is comprised of shared services. That is, DHIN's functions enhance the ability of providers within the state to obtain unparalleled access to patient data but also to share data beyond the functional capabilities of the organizations involved. In order to accomplish this DHIN offers its participants a set of core services that will be expanded over time. Today, these services include: identity management, data distribution, EHR

delivery, public health reporting, security audit, vocabulary services, record locator service, master patient index, and ambulatory medication.

Legal/Policy

DHIN was created by statute, which defines its governance as well as provides liability protections. Additionally, DHIN has promulgated regulations for participation in the network, which includes patient notification of the use of DHIN. Furthermore, policies, procedures and/or protocols for privacy and security, provider relations and user management, and system monitoring have been adopted and a continuous evaluation of these policies and procedures is in place to ensure that the DHIN remains in compliance with State and Federal laws and regulations as well as the changing HIE environment.

With the assistance of DHIN's hospitals, privacy officers, legal counsel and Consumer Advisory Committee, DHIN has established a privacy policy that considers individuals' rights and expectations, while balancing the need for health care providers to have information that enables them to make informed decisions and ultimately provide better quality health care services. DHIN's Access to Individually Identifiable Health Information Policy is applicable to all users and data contributing organizations of DHIN.

A successful first time log-in to the DHIN system results in the display of a data use agreement. Before a user can log-in for access to clinical data for the first time, they must read and agree to the terms of the agreement. This action is equivalent to an electronic signature. Additionally, DHIN has signed Memoranda of Agreement with each of its data sender organizations, which outline roles and responsibilities and fiduciary requirements; a business associate agreement also is required between DHIN and all data senders as well as EHR vendors. Due to State law, DHINs privacy policy has not addressed public health reporting as this is required to be done electronically by hospitals and labs and DHIN is the method by which these organizations use to accomplish electronic public health reporting.

In addition to ensuring DHIN policies and procedures are in adherence to Federal and State law and are carried out with the patient's rights to privacy and security in mind, DHIN also has made strides in addressing other legal/policy issues that hinder health information exchange. In January 2009, DHIN

promulgated a regulation regarding participation in DHIN and patient notification, which included a clause that addressed the limitations that CLIA puts on reference laboratories with regard to releasing data to the DHIN without having the provider first sign-up and consent to having their data delivered through DHIN. This issue resulted in data not being available to DHIN users upon query of a patient's history in DHIN. Resulting from the regulation, the reference laboratories are now able to send data for all Delaware providers regardless of their enrollment status in DHIN. The DHIN will review other policies and barriers to exchange to determine the need for additional policy changes. For example, the DHIN may review laws and policies and recommend changes to support health plan participation so that in the event the DHIN wishes to work with health plans to exchange data, the patient is not at risk for being penalized (affecting their current or future coverage) due to the health plan having access to this data.

Performance Measures

DHIN will respond to the specified performance measures through collaboration with appropriate organizations in the State of Delaware as described below.

Percent of providers participating in HIE services enabled by statewide directories or shared services:

DHIN will work with the public and private health plans in Delaware as well as the Division of Professional Regulations and the professional associations to develop a registry of providers. It will then compare the DHIN participant list against the registry to determine the percent participating in DHIN.

Percent of pharmacies serving people within the state that are actively supporting electronic prescribing and refill requests:

DHIN will work with the Delaware Pharmacists Association, public and private health plans as well as the DHIN medication history vendor to understand the percent of pharmacies supporting ePrescribing.

Percent of clinical laboratories serving people within the state that are actively supporting electronic ordering and results reporting:

Through the development of shared directories, the DHIN will have an understanding of all the clinical laboratories serving Delaware providers and patients. Based on this information, DHIN will report on the percentage that participate in DHIN for electronic orders and results delivery.

Recipients will also be required to report on additional measures that will indicate the degree of provider participation in different types of HIE particularly those required for meaningful use:

DHIN will work with Medicaid to define the reporting requirements for establishing meaningful use resulting in Medicaid incentive payments. These measures will also be reported to ONC upon requirements definition.

Project Management

The DHIN staffing model is comprised of three teams: Financial Management, Technical Operations, and Communications and Provider Relations. The Financial Management Team (finance manager and accounting clerk (to be hired)) is responsible for budgeting, managing revenue and expenses, financial reporting and accounts payable and accounts receivables. The Technical Operations Team (project managers (to be hired) and management analyst) is responsible for managing the technology contracts, overseeing the project plan, managing EHR vendor relationships, working with participant organizations, collaborating with the provider relations team to address provider issues, and monitoring the system for availability, usage, access controls and security. This team oversees the work of the Project Management Committee (described in the Project Plan section) and is responsible for tracking and monitoring the project to ensure that it is progressing according to plan.

The Communications and Provider Relations Team (communications manager, implementation specialists and clinical liaison) is the "face of DHIN." They are responsible for enrolling and training DHIN users, communicating with consumers and addressing questions or concerns, providing customer service to providers and working with potential data sender and EHR partners to educate them on DHIN participation, make presentations in the community to educate providers and consumers on DHIN, and develop marketing and communications materials.

The DHIN Executive Director provides day-to-day leadership for the DHIN and represents DHIN locally and nationally. A planned Executive Assistant will support the work of the Executive Director. This new position will help to manage the activities of the DHIN as well as will support executive level

communications with the DHIN stakeholder organizations and the General Assembly. The Executive Assistant will support the Executive Director with contract negotiations activities and management and reporting for Federal contracts and grants.

Currently, all DHIN staff are hired under a contractual relationship with Advances in Management, Inc. Dependent upon the work of the Governance Workgroup, these contractual personnel may become DHIN employees as soon as mid-2010.

Evaluation

DHIN has completed the planning phase of its evaluation project with a third party contractor. At the onset of the evaluation planning process, DHIN organized an Evaluation Steering Committee comprised of members of key stakeholder groups, who set expectations for the contractor as to what should come out of the evaluation. The contractor then developed a comprehensive list of approximately 140 suggested evaluation questions, categorized by type of question or metric (i.e., process measurement, data sender perception, cost changes), along with an assigned ranking for the feasibility of data collection and the priority level of each question. The steering committee then met twice to determine the ranking and feasibility of collecting the information. The resulting questions were then organized into the following categories.

1. Use of DHIN-Data Senders: Metrics for how data senders, such as hospitals, laboratories, imaging centers, use and gain value from participation in DHIN.
2. Costs For DHIN Participation: Metrics of costs for clinical providers to initiate and maintain DHIN participation.
3. Public Health: Metrics related to reporting and use of data for public health surveillance.
4. Use of DHIN–Process Measurements: Metrics on processes of actual DHIN use.
5. Payer Cost Savings: Metrics of healthcare cost changes.
6. Use of DHIN–Clinical Provider / Data Receiver Perceptions: Metrics on healthcare provider perceptions and satisfaction with participation in DHIN.
7. Cost Changes: Metrics on clinical practice changes in costs.

With the evaluation planning process now complete, DHIN will begin the bidding process for the Tier 1 data collection phase of the evaluation in January 2010. This phase is expected to be completed by year end 2010 resulting in baseline information. The same information will be collected again over the

following year to determine metric changes and insights on those changes, with the final comprehensive report expected to be completed by year end 2011.

Organizational Capability Statement

Under DHIN's current management and leadership, it became the first statewide HIE in the country and continues to make exceptional progress in user adoption, technical functionality, financial sustainability and enhanced connectivity. The DHIN is a public instrumentality of the State of Delaware and therefore, is governed by all State laws regarding oversight and fiscal management. DHIN is a not-for-profit entity by virtue of its status in State government. A tax exempt certificate is provided in Appendix D.

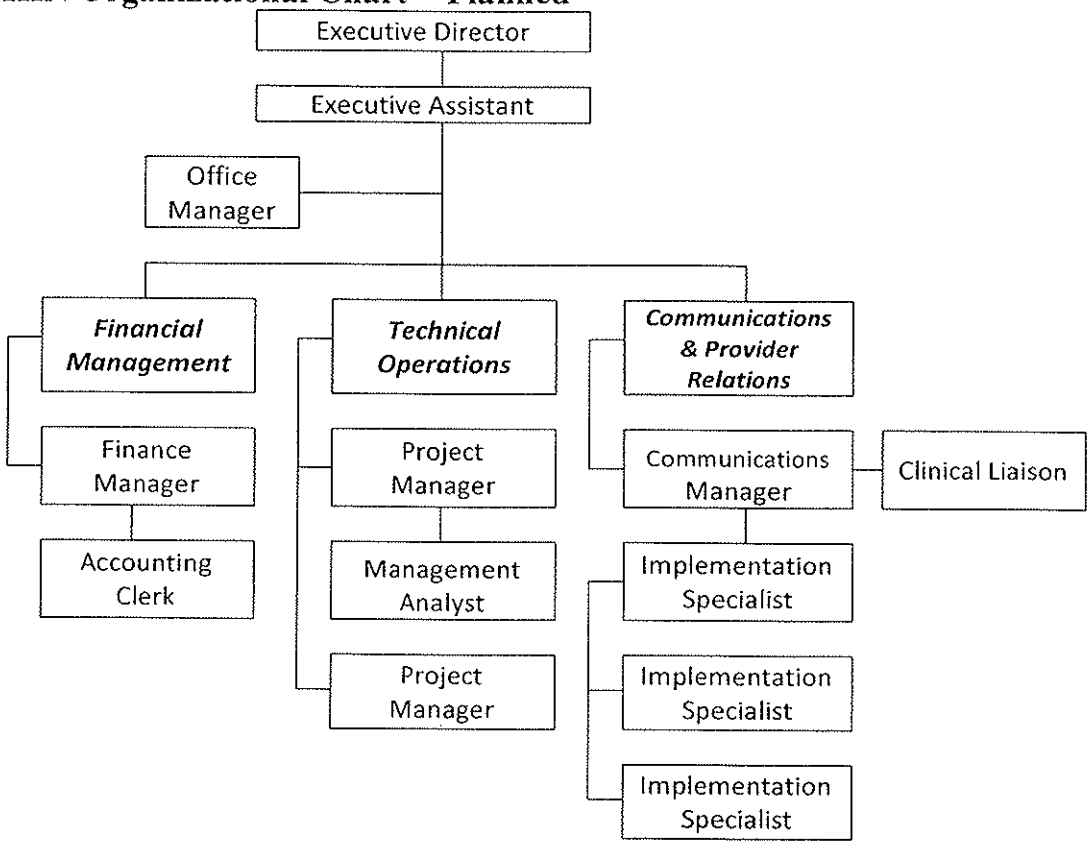
The DHIN has had fiscal responsibility for State, Federal and private funding since its inception in 1997. In 2005, DHIN received a federal contract from the Agency for Healthcare Research and Quality (AHRQ) for five years and $4.7 million. This contract has been managed by the current DHIN management team since it's award. Furthermore, it has been management with great efficiency and in accordance with federal law. In 2007, DHIN was awarded a contract for the NHIN Trial Implementations for nearly $2.0 million. This project was extended for an option year ending February 2010. DHIN has met all contractual requirements for these projects, including submitted reports and preparing presentations.

Additionally, DHIN receives State funding annually, which requires reporting to the State legislature annually. These State funds require a private sector match. DHIN's management team negotiates with its private sector participants annually to ensure all expenses are met and State funds are adequately matched to maximize revenue. Upon agreement to participate as a data sender in DHIN, all data sender organizations enter into a memorandum of agreement (MOA) with DHIN. The MOA outlines the participation requirements and roles and responsibilities of each party. The DHIN regulation on participation passed in January 2009 also is referenced in the MOA. An MOA template is provided in Appendix E. Individual MOA signed with each participating organization will be provided upon request.

The following organizational chart illustrates the current governance structure as well as current

and planned management and staffing. The Cooperative Agreement will be absorbed into the current organization and managed and supported by additional staffing resources, represented in yellow. Those positions noted with an asterisk (*) are in the process of being hired. All of the positions noted in the organizational chart are critical to the State HIE Cooperative Agreement and the successful implementation, management and deployment of new functions and services. Resumes for all key personnel are provided in Appendix F.

DHIN Organizational Chart – Planned



Collaborations with Key Participating Organizations and Agencies

DHIN has strong ties to the majority of health care entities in Delaware. With ties to State government, DHIN enjoys a strong working relationship with Medicaid, the Division of Public Health, who also are represented on the DHIN Board of Directors, as well as the State's mental health agencies for children and adults and the correctional health system. Furthermore, Delaware's collaborative environment brings together consumers, hospitals, health plans, physicians and reference laboratories to focus on efficient and effective health care through health information exchange. As the convener of these activities, DHIN sits at the center of Delaware's health care system; revolutionizing how patients receive health care in the State. Appendix G includes letters of support from many of these organizations, including hospitals, health plans, Medicaid, public health, the state medical society, the Health Regional Extension Center applicant for Delaware and the State IT department.

Delaware Statewide Strategic and Operations Plan for Health Information Exchange

Last Updated October 2009

Delaware Health Information Network
107 Wolf Creek Blvd, Suite 2
Dover, Delaware 19901
Phone: (302) 678-0220
Fax: (302) 645-0398
www.DHIN.org

Introduction

In 2007, Delaware launched the nation's first operational, standardized, real-time, interoperable statewide health information exchange, connecting hospitals, reference laboratories, and physician practices across the state. The Delaware Health Information Network (DHIN) originated as a vision of the Delaware General Assembly, which established the instrumentality in 1997. Created in statute as a public–private partnership, DHIN was given the mission of developing an electronic data interchange network to provide health care professionals across the state with immediate access to the most current patient information at the point of care.

Where political, logistical and technical barriers previously existed, DHIN has succeeded in bridging geographical and organizational boundaries to expedite the availability of clinical test results to health care providers. Via the Delaware Health Care Commission (DHCC), DHIN contracted with technology firms Medicity, Inc. and Perot Systems in September 2006 to implement and maintain the software solutions and technological infrastructure needed to ensure more timely delivery of laboratory and pathology results, imaging studies, and admission face sheets. On March 30, 2007, DHIN went live with a technical pilot; and on May 1, 2007 the system was fully operational in five physician practices. In June of 2009, DHIN deployed a community master patient index (CMPI) and record locater service (RLS) to enable patient record search of over two years of clinical history available through DHIN by way of a web-based community health record. As of September 30, 2009, 1198 health care providers were using DHIN to receive clinical results and search for a patient-centric clinical summary.

In 2005, DHIN was awarded an Agency for Healthcare Research and Quality (AHRQ) State and Regional Demonstration project contract. The contract was for $4.7 million over five years ending September 2010. Additionally, DHIN was selected as one of the original nine health information exchanges to participate in the Nationwide Health Information Network (NHIN) Trial Implementation project led by the Office of the National Coordinator for Health Information Technology and was subsequently awarded an option year contract to continue participation in the NHIN. Furthermore, DHIN's Executive Director participates on the Federal HIT Standards Committee created under the American Recovery and Reinvestment Act (ARRA) and is a member of the HIE Certification Workgroup of the Certification Commission for Health Information Technology (CCHIT). As such, DHIN is helping to shape the infrastructure, standards and policies for nationwide health information exchange and technology adoption.

Vision and Goals

The vision of DHIN is to develop a network to exchange real-time clinical information among all health care providers (office practices, community clinics, hospitals, laboratories and diagnostic facilities, etc.) across the state to improve patient outcomes and patient-provider relationships, while reducing service duplication and the rate of increase in health care spending.

The DHIN's five primary goals serve as the basis for interoperability among all health care providers in the State of Delaware:

1. To improve the care received by patients served by Delaware's health care system and to reduce medical errors associated with the often inaccurate and incomplete information available to providers of medical care.
2. To reduce the time required and financial burdens of exchanging health information among health care providers and payers (necessary for patient care), by addressing the currently siloed and unintegrated model of distribution methods and dramatically increasing use of electronic means.
3. To improve communication among healthcare providers and their patients to provide the right care at the right time based on the best available information.
4. To reduce the number of duplicative tests to afford specialists a more comprehensive view of the patient upon referral from his/her primary physician and to expedite the reporting of consultant opinions and tests/treatments between specialists and the referring physicians.
5. To improve the efficiency and value of electronic health records (EHR) in the physician office and to assist those physicians without an EHR to better organize and retrieve test results.

DHIN Governance

The DHIN was created through Delaware legislation in 1997 to "...promote the design, implementation, operation and maintenance of facilities for public and private use of health care information in the state..." DHIN's original enabling legislation (Delaware Code Title 16, Part XI, Chapter 99, Subchapter 9922) details the Powers and Duties of this public-private partnership: "Develop a community-based health information network to facilitate communication of patient clinical and financial information, designed to:

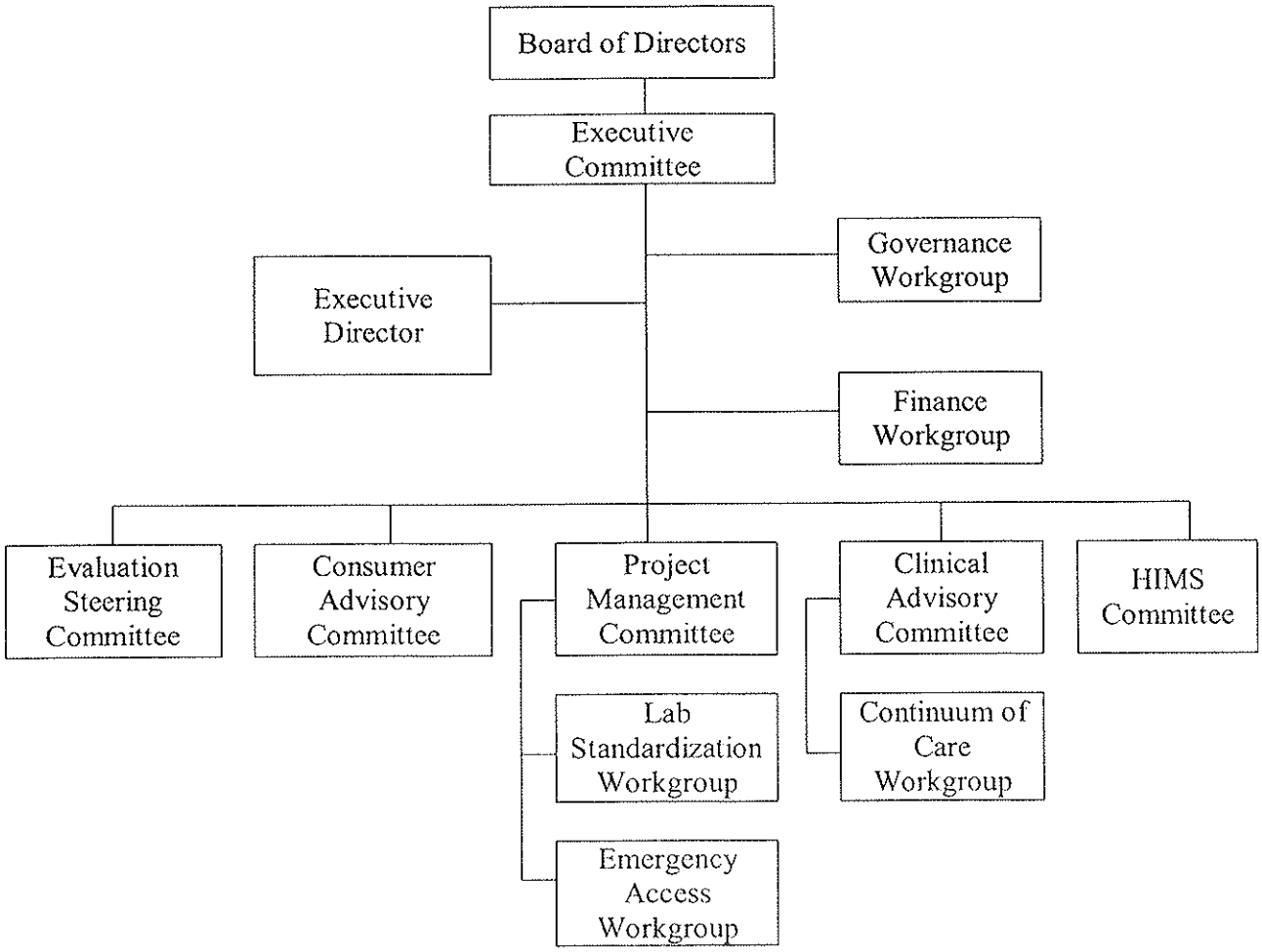
- Promote more efficient and effective communication among multiple health care providers, including, but not limited to, hospitals, physicians, payers, employers, pharmacies, laboratories and other health care entities;
- Create efficiencies in health care by eliminating redundancy in data capture and storage and reducing administrative, billing and data collection costs;
- Create the ability to monitor community health status; and
- Provide reliable information to health care consumers and purchasers regarding the quality and cost effectiveness of health care, health plans and health care providers..."

Since the DHIN's original charge was written over a decade ago, its Board has engaged in several studies and pilot projects directed at fulfilling its mission. As a result of these efforts, DHIN, through the partnership developed by its members, holds the distinction of becoming the first statewide clinical health information exchange in the nation.

The Public-Private Board of Directors is comprised of diverse organizations all representing the primary stakeholders of health information exchange. The Board composition is comprised of approximately 30 percent of directors representing the public sector and 70 percent of directors representing the private sector. They include representatives from the following constituency groups, organizations and agencies (refer to Appendix A for the current list of Directors):

- Consumers: non-affiliated consumer representation
- Providers: Delaware Healthcare Association (3 members representing hospitals) and the Medical Society of Delaware (3 members representing physicians)
- Payers: Blue Cross Blue Shield of Delaware and Delaware Physicians Care, Inc., a wholly owned subsidiary of Aetna
- Public: Delaware State government agencies, including Delaware Health Care Commission, Department of Insurance, Department of Technology and Information, Division of Medicaid and Medical Assistance, Division of Public Health, Office of Management and Budget
- Employers: Delaware State Chamber of Commerce
- Researchers: University of Delaware

An Executive Director oversees the day-to-day operations of the project with support from staff and guidance from the DHIN Executive Committee as well as advisory committees and ad-hoc workgroups who steer the project and ensure input and buy-in from all stakeholder groups.



Committees and Workgroups

DHIN's committees and workgroups include:

Clinical Advisory Group
The Clinical Advisory Group (CAG) provides a forum for clinical and administrative staff from DHIN user organizations to advise DHIN on use of the system, improvements and additions they recommend. The CAG works in collaboration with the Consumer Advisory Committee to make privacy and security policy recommendations to the Board of Directors as indicated. Additionally, the CAG assists DHIN in addressing issues and barriers to the adoption of DHIN for practices across the state as well as reviews and makes recommendations on materials developed to educate and support DHIN users. The CAG membership is comprised of physicians and practice administrators from private practices, Federally Qualified Health Centers and hospitals. The CAG is staffed by the Provider Relations Team and supported by the DHIN technology partner, Medicity, Inc.

Consumer Advisory Committee
The Consumer Advisory Committee (CAC), one of DHIN's first advisory groups, was created in 2004 to provide for consumer focus and to offer input to the DHIN development, planning and implementation. The CAC meets regularly with its focus on privacy and security, and marketing and education activities for consumers about DHIN. The group developed the framework for the DHIN privacy policy and procedures, which were approved by the Board of Directors and have been implemented by DHIN staff, and supported by the technology. Additionally, the group has worked on marketing and educational materials for use in promoting the DHIN. They assisted in design and content selection for consumer materials. CAC membership is comprised of representatives from such groups as the Mental Health Association of Delaware, the National Alliance for Mental Illness, AARP, State Council for Persons with Disabilities, faith-based organizations, family caretakers, community health centers, consumer health library services, and users of the health care system.

Evaluation Steering Committee
The mission of the DHIN Evaluation Steering Committee is to provide guidance and expertise to DHIN and its contractors in the development, execution and reporting of DHIN's evaluation plan. The Steering Committee is comprised of the Director of the Center for Applied Demography and Survey Research at the University of Delaware, the Director of Medical Informatics at Christiana Care Health System, the Director of the Centers for Outcomes Research at Christiana Care Health System, and the DHIN's Executive Director and Financial Manager.

Health Information Management (HIM) Committee
The HIMS Committee was formed to provide guidance and oversight for ensuring the data integrity of information provided through the DHIN. The Committee members are also members of their organization's HIMS department, representing hospitals and also include reference laboratory members. The HIMS Committee develops DHIN business processes to ensure consistency of data management and master patient index (MPI) integrity. Committee members provide guidance and input to the Project Management Committee on the impact of adding new functionality on existing DHIN data as well as developing use cases and requirements for testing new data types and data sources.

Project Management Committee
The Project Management Committee supports the work of the DHIN Project Manager by providing day-to-day input and guidance on the project management, implementation and testing processes. The Committee members ensure that their respective organizations are appropriately represented at various stages of the implementation process, including interface coding and maintenance, testing, data standardization, monitoring. Committee members coordinate with the necessary business units within their organizations to ensure buy-in and commitment at all levels. Additionally, this Committee provides guidance for planning future functions, makes change requests, and ensures technical resources are appropriately dedicated to the project and that their systems are positioned for DHIN connectivity. The Committee makes recommendations to DHIN leadership and monitors the project plan/timeline and oversees resource management to ensure the project is implemented on time and consistent with specifications.

Continuum of Care Workgroup (Long-Term Care and Home Health)
The purpose of the Continuum of Care Workgroup is to determine how DHIN can support patient care along the health care continuum and to identify potential processes that enable the use of DHIN to facilitate communication of critical patient data as patients make transitions between hospitals, long term care facilities and home health care. Committee membership includes representatives from hospitals, home health agencies, long term care agencies and regulatory agency leadership. As the application of DHIN expands to other points of care, rehabilitation services representation will be added to the Workgroup.

Emergency Access Workgroup
The Emergency Access Workgroup is an ad hoc group of emergency medical providers that meets as needed to provide guidance to DHIN with regard to developing solutions for emergency services, medication history, and access rights for emergency providers. The Emergency Access Workgroup has provided insight into the workflow of the Emergency Department and will be the primary participants in the DHIN Medication History Pilot. The members of this workgroup consist of Emergency Department physicians and lead nurses. As the DHIN expands is reach, the Workgroup will be expanded to include emergency medical technicians and paramedics.

Finance and Sustainability Workgroup
A Finance and Sustainability Workgroup of the DHIN Board of Directors has been formed to provide guidance and oversight for the work of the Finance Manager, including formalizing financial policies and procedures, reporting requirements, etc. The Finance Workgroup is considering several options for establishing a long-term revenue structure to ensure DHIN's sustainability. Options include: user fees, subscriptions, and/or volume-based charges. These options and others will be explored by the Workgroup for recommendation to the Board of Directors in December 2009. The Finance Workgroup is comprised of DHIN stakeholders, including health plans, physicians, hospitals, reference laboratories, and state representatives from the Office of Management and Budget and Medicaid.

Governance Workgroup
The Governance Workgroup is responsible for considering governance options and making recommendations to the DHIN Board of Directors regarding the most appropriate direction for governance and oversight of the health information network as it moves from development to

ongoing operations. The Workgroup considers the political, operational, technical, and market climates to ensure that the governance model is able to meet the needs of all stakeholders and constituencies. The governance model must ensure that DHIN is able to make rapid decisions, which consider the best interest of all stakeholders, act in a nimble manner and have proper fiduciary oversight and processes to manage a diverse and complex budget. The Governance Workgroup consists of representatives from employers, health plans, physicians, hospitals, reference laboratories, consumers and State representatives including the Delaware HIT Coordinator and the Department of Health and Social Services. This Committee will make recommendations to the DHIN Board of Directors by December 2009 and any needed legislation required to support the governance model is expected to be submitted to the General Assembly in January 2010.

Lab Standardization Workgroup

The Lab Standardization Workgroup provides guidance on the development of result and ordering compendium standardization, lab result trending and electronic lab test ordering. The Workgroup is overseeing the LOINC mapping process as well as is defining methodologies for electronic lab ordering through DHIN, including analyzing workflow changes, developing business processes and defining policies and procedures needed to support the new system functions. The Lab Standardization Workgroup is also responsible for developing test requirements and is directly involved with testing electronic orders and lab result trending functionality. The members of this workgroup consist of the laboratory directors from all the DHIN data sending organizations as well as the respective project managers.

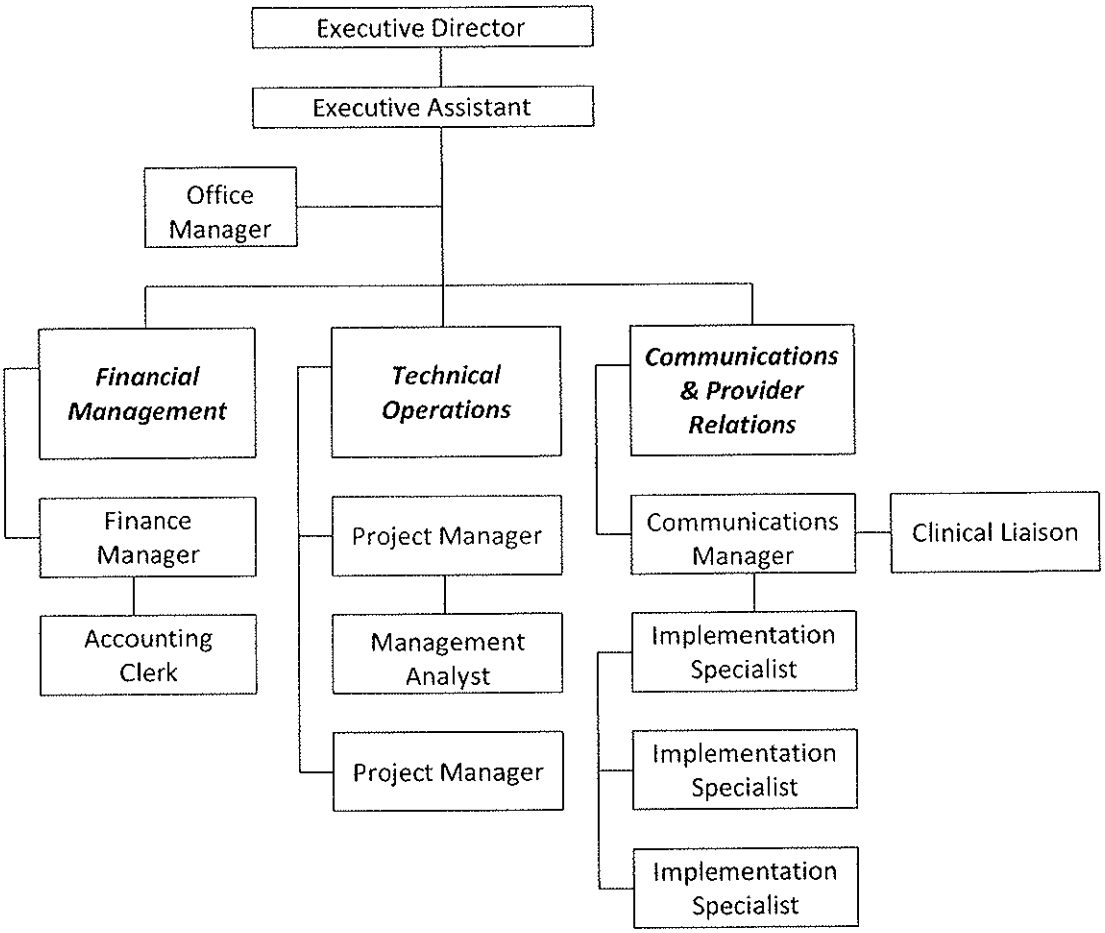
Staffing Model

The DHIN staffing model is illustrated in the organizational chart below. The highlighted boxes are planned positions. There are three teams in the DHIN organization: Financial Management, Technical Operations, and Communications and Provider Relations. The Financial Management Team is responsible for budgeting, managing revenue and expenses, financial reporting and accounts payable and accounts receivables. The Technical Operations Team is responsible for managing the technology contracts, overseeing the project plan, managing EHR vendor relationships, working with participant organizations, collaborating with the provider relations team to address provider issues, and monitoring the system for availability, usage, access controls and security. The Communications and Provider Relations Team is the "face of DHIN." They are responsible for enrolling and training DHIN users, communicating with consumers and addressing questions or concerns, providing customer service to providers and working with potential data sender and EHR partners to educate them on DHIN participation, make presentations in the community to educate providers and consumers on DHIN, and develop marketing and communications materials.

The DHIN Executive Director provides day-to-day leadership for the DHIN and represents DHIN locally and nationally. A planned Executive Assistant will support the work of the Executive Director. This new position will help manage DHIN's day-to-day activities and staff as well as support executive level communications with the DHIN stakeholder organizations and the General Assembly. The Executive Assistant will support the Executive Director with contract negotiations activities and management and reporting for Federal contracts and grants. This position will also assist with budget development, analysis, and implementation and provide

guidance and consultation to the ED regarding stakeholder priorities, policy implementation and issues resolution.

DHIN Organizational Chart (planned)



Accountability and Transparency

The statute creating the health information network in Delaware (Delaware Code Title 16, Part XI, Chapter 99, Subchapter 9922) established the DHIN as a public instrumentality of the State. As a State entity, all meetings of the DHIN Board of Directors are conducted in public unless it is closed to the public, via executive session, in accordance with state law. Meeting notices are posted on the State of Delaware website in advance in accordance with Delaware Code: Title 29, Chapter 100, Freedom of Information Act.

DHIN is also required to permit access to its public records in accordance with the law and as defined in Delaware Code Title 29, Chapter 100. A Delaware citizen that wishes to inspect the Board's public records shall call or write to staff to determine a convenient time and place. The

Chairperson and/or Executive Director may request legal advice from the Attorney General and authorize access to public records.

Collaboration

Coordinated, collective action is required at every level of the health care system to realize the full benefit of health information exchange. Collaboration is essential to ensuring interoperability across providers of care. DHIN has achieved a significant and growing level of interoperability because it is flexible enough to work with the existing systems and infrastructure at the participating organizations from both a technical and operational standpoint.

DHIN is capable of connecting with virtually any system or technology solution able to transmit Health Level 7 (HL7) transactions – the internationally accepted standard for health care data sharing – and can also support other industry formats such as CCR/CCD/ANSI standard transactions. This architecture ensures wide adoption of the system by organizations that perform tests and services in support of clinical care. The success of DHIN is dependent on cooperation and consensus-building across all participating organizations in order to achieve a critical mass of provider adoption. By bringing everyone to the table (health care professionals from competing hospitals and health systems, laboratory personnel, technology specialists, consumers, and State officials), the network has been able to reach meaningful compromises to work toward building a system that meets the greatest needs of all end-users. To that end, DHIN enables provider participation regardless of the level of technology adoption in physician offices that have historically been slow to adopt clinical information systems.

It is DHIN's goal to support providers (hospitals and physician practices) in meeting meaningful use criteria in a manner that allows them to maintain their current systems and allows for them to leverage their investment in DHIN to support standardized reporting, meet eOrder entry, ePrescribing, public health reporting and quality reporting requirements, among others.

State Government HIT Coordinator

The Governor has appointed Richard Wadman of the Department of Technology and Information (DTI) to be the State Government HIT Coordinator. Mr. Wadman is a Customer Relationship Specialist with the Delaware State Department of Technology and Information and reports directly to the State's Chief Information Officer—a Cabinet level position. In this role, he has served in a capacity similar to the State HIT Coordinator for many years supporting the Delaware Health Information Network as well as the Department of Health and Social Services (including Public Health, Substance Abuse, Mental Health, and Behavioral Health, Social Services, Medicaid and Medical Assistance, Child Support Enforcement, Long-Term Care, and Physically and Developmentally Disabled), the Department of Services for Children Youth and Their Families (including Family Services, Foster Care and Adoption, Child Mental Health, and Juvenile Justice), Delaware State Housing Authority and the Department of Labor. Mr. Wadman also has been the primary coordinator for linkages between the DHIN and. the Department of Correction (correctional health services). In this capacity, Mr. Wadman facilitates coordination of technology infrastructure within and among these agencies. He was also appointed by the Lt. Governor to chair the State's Subcommittee on Health Information Technology focusing on the ARRA HITECH act requirements for States.

Mr. Wadman is uniquely positioned to support the requirements of the State HIT Coordinator as he has already developed the necessary relationships and is keenly aware of the technical and operational needs of the federally funded programs administered by these State agencies. In his role, he is responsible for:

- Owning and maintaining the relationship between DTI and the state agencies with which he works.
- Partnering with customers to understand and evaluate the current business environment and processes and to define the future environment based upon business requirements and best practices.
- Recommending solutions that improve business process performance for the customer and are aligned with enterprise technology strategy and standards.
- Working with technical teams and vendors to ensure delivery of required systematic solutions.
- Documenting functional requirements, conversions, upgrades, interfaces, reports, and workflow.
- Acting as liaison and problem solver to drive resolution of customer issues or restoration of service.
- Champion for DTI's clients and marshalling the resources of DTI and its vendors to ensure customer satisfaction.
- Project tracking / solutions delivery with customers.

Standards

Using widely adopted industry standards such as HL7 enables healthcare organizations to participate in the exchange of healthcare information as standards continue to evolve. The DHIN's technology partner, Medicity, is a member of HL7 and through its ongoing partnership with DHIN, participation in the national health information network, as well as Medicity's relationships with other regional and state-wide health information exchanges, Medicity is on the forefront of emerging national standards and as such incorporates standards and the capabilities associated with these standards.

Format Specifications: Support for many variations of the defined HL7 specifications - HL7 2.5.1, 2.6, 3.0

Format Rationalization: HITSP standards were handed to ONC in 2008 to rationalize, the outcome was a new format combining HL7 v3 CDA and ASTM CCR into the HITSP - CDA, CCR, CCD

Interoperability Services: Patient search and exchange (PIX/PDQ support) services; Clinical document search and exchange services (XDS/XDA); Auditing services (ATNA) services - PIX, PDQ, XDS, ATNA

National HIE-to-HIE Prototypes: Represented the State of Delaware in applying all of the aforementioned standards and newly defined technical and security specifications for a secure exchange with other HIEs while demonstrating the Lab and Bio-surveillance use cases - [illegible]

Certifications: Medicity and DHIN are alpha participants in the CCHIT certification process for HIEs, and as a result will be one of the first to be certified

Receive, Transmit, and Create a CCD

DHIN demonstrated the query, exchange and viewing of a clinical summary using the HITSP Continuity of Care Document (CCD) standard for the NHIN trail implementation in September 2008, whereby the CCD was implemented using test data in a demonstration environment. This demonstrated functionality is especially useful for the exchange of discreet clinical data such as lab results, other clinical results, medications, radiology reports as well as chart abstracts in the case of a user who is not yet enrolled in the network. Within the DHIN network the following CCD exchange services will be offered:

1. EMR CCD Exchange – as EMRs are able to support sending CCD documents to DHIN, DHIN will make this information available to the network.
2. HL7-to-CCD Exchange – for those data providers that cannot yet support the HITSP standard, the DHIN conversion services will receive data in a nonstandard format (typically HL7), and will convert it into a CCD format in order to make it available by other systems and queries.
3. CCD Exchange for Referral and Consult – to support for coordination of care among State mental health services for adults and children, the CCD will be used to facilitate the referral processes used to integrate the patient into community-based service providers.
4. CCD Aggregation Services – to support Social Security Administration workman compensation and disability claims, the DHIN has the ability to provide aggregated CCD records and can also serve as a single pipe for any CCD record; thus reducing the number of connections to individual organization and increasing the turn-around time for clinical information needed to support such claims.
5. CCD to HL7 Document Exchange — for recipients of data that are not able to support the consumption of inbound CCD document, such as public health or other registries, DHIN can translate CCD data into HL7.
6. Personal Health Records (PHR) and Health Record Bank integration – supporting a CCD or aggregated CCD for distribution to PHRs and health record banks will promote the meaningful use requirement for consumer engagement

Process NHIN standard transactions

Support for all applicable HIE profiles (ATNA logging, PIX/PDQ, etc.) and have successfully interoperated with NHIN gateways (initiating and responding) as required for participation in the 2008 (and ongoing) NHIN Trial Implementations. DHIN currently support national HIE-to-HIE standards and will continue to provide new releases as the standards change with time. While demonstrating use cases at the NHIN trial implementation, DHIN completed requirements for current and new technical messaging and security standards for secure HIE-to-HIE exchange, including: core Microsoft-certified web service extensions, X.509 Certificate Token, SAML, and SOAP message security.

HIT Adoption in Delaware

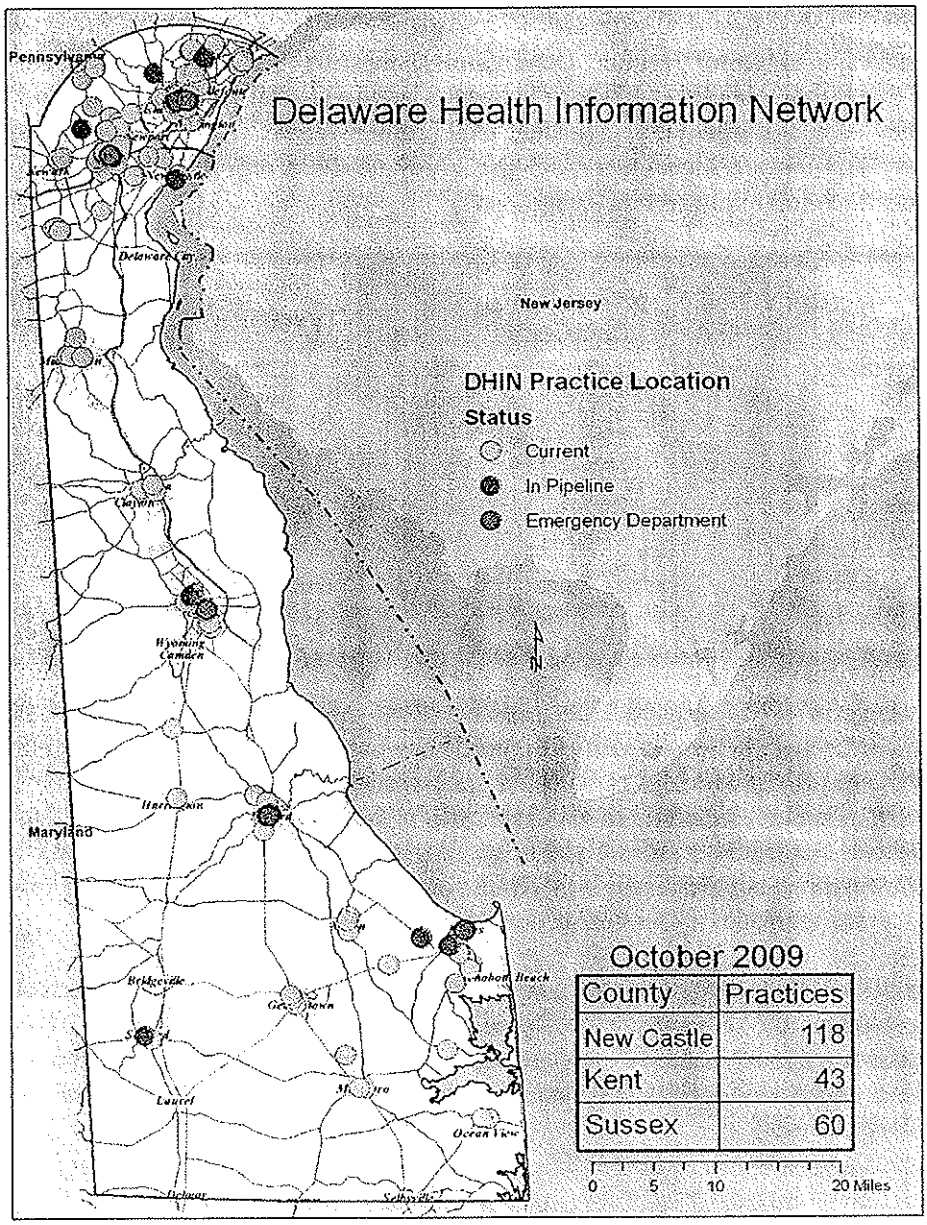
The University of Delaware's Center for Applied Demography and Survey Research, on behalf of the Delaware Division of Public Health's Office of Primary Care and Rural Health, conducts a capacity study of primary care and specialty providers every other year. The last study was completed in 2008. The following are highlights from the 2006 and 2008 report with regard to physician response to questions related to use of technology.

Use of Technology	2008 % Primary Care	2006 % Primary Care	2008 % Specialists	2006 % Specialists	% All Respondents 2008
High Speed Internet Connection	88%	74%	89%	78%	88%
Electronic Billing	90%	88%	83%	84%	86%
Electronic Scheduling	86%	82%	82%	79%	84%
Email	70%	68%	85%	81%	78%
Electronic Medical Records	43%	28%	51%	43%	48%
Electronic Order Entry	22%	15%	29%	26%	26%
Electronic Prescribing	30%	22%	25%	21%	27%
Electronic Lab/Rad Results	53%	34%	48%	46%	51%
Local Area Network	66%	57%	69%	70%	68%

While all use of technology in physician practices has increased during the two year period between 2006 and 2008, the use of electronic medical records has increased the greatest at a rate of 15 percent for primary care providers and 8 percent for specialists. In 2008, nearly 50 percent of Delaware physicians are using an electronic medical record. It should be noted, however, that the survey does not define electronic medical records. As a result, this number may be exaggerated. Access to electronic lab and radiology results also has significantly increased for primary care providers – a rate increase of 19 percent over the two-year period.

With regard to adoption of DHIN, the map on the following page illustrates the geographic and special distribution of providers by service location type and enrollment status in the DHIN. DHIN enrollment has grown by more than 50 percent since the implementation of the patient search function, affording authorized providers secure, immediate access to patient clinical history at the time and place of care.

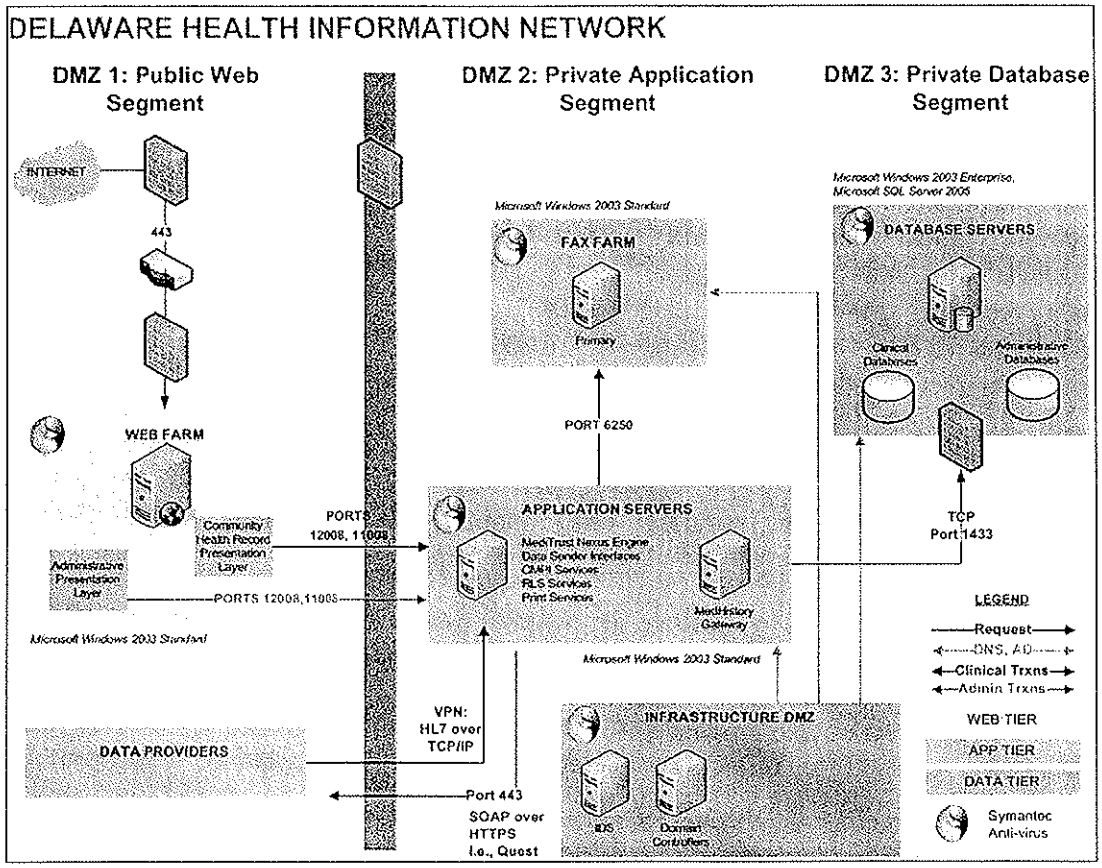
Distribution of DHIN Users



Business Operations & Technical Infrastructure

Architecture

DHIN's architecture has been reviewed and approved against the State's standards for an n-tier Internet architecture. See attached (below) for the technical architecture. The platform is incrementally scaled at all tiers to handle both a growth in users and clinical/administrative transactions.



Delaware's Department of Technology and Information has validated both physical and logical security and determined the DHIN infrastructure to be compliant with State requirements.

Participants

DHIN connects Delaware's largest cities with outlying rural and coastal areas through the participating organizations of BayHealth Medical Center (Dover and Milford), Beebe Medical Center (Lewes), Christiana Care Health System (Wilmington, Newark), and Laboratory Corporation of America (LabCorp), Quest Diagnostics, and Doctors Pathology Services each serving the entire state. St. Francis Hospital (Wilmington) will go live in early 2010. As of September 2009, DHIN participation has included more than 50 percent of Delaware health care providers, including all of the state's four Federally Qualified Health Centers.

Functionality

Five Year Implementation Plan (2006 to 2011)
DHIN's current implementation plan is consistent with guidance provided by the Office of the National Coordinator for Health Information Technology (ONC). ONC recommended functionality includes:

- Electronic eligibility and claims transactions
- Electronic prescribing and refill requests
- Electronic clinical laboratory ordering and results delivery*
- Electronic public health reporting*
- Quality reporting
- Prescription fill status and/or medication fill history*
- Clinical summary exchange for care coordination and patient engagement

Those noted with an asterisk (*) have already been or are in the process of being implemented by the DHIN. In fiscal year 2010 (7/1/09 to 6/30/10), DHIN also will offer medication fulfillment history, transcribed reports delivery, radiology image inquiry, and bidirectional exchange with EHRs for laboratory tests ordered in an ambulatory environment.

The following schedule is provided to illustrate the roll-out of current and future functionality in the DHIN. This schedule was first developed in the 2005 DHIN strategic plan. The roll-out timing of some of the functions have changed due to changing priorities among DHIN's participants as well as direction and guidance provided by the Federal government. As such, the schedule has been updated to reflect completed functionality and planned functionality deployment over the next four years.

Implementation Year	Functionality Deployed
Year 0 2006 - 2007 Completed	Data Transport Security & Access Controls Audit Processing and Reporting Secure Results/Reports Delivery Laboratory Results Pathology Results Radiology Reports Admission, Discharge, Transfer Reports Patient Demographics/Face Sheets Inbox Management • Printing & Faxing • Sorting • Results Retrieval & Reprinting • Results Forwarding • Interfaces to EHR Systems

Implementation Year	New Functionality
Year 1 2007 - 2008 Completed	Two-tiered, delegated MPI and Community MPI (CMPI) Record Locator Service Interfaces to EHR Systems New Participants Public Health Reporting
Implementation Year	**New Functionality**
Year 2 2008 -2009 Completed	MPI Harmonization Inquiry Viewing of Patient-Centric Data Additional Interfaces to EHR Systems New Participants
Implementation Year	**New Functionality**
Years 3 2009 - 2010 In Progress	Laboratory Order Entry from EHR PACS image retrieval Transcribed Reports Medication History Additional Interfaces to EHR Systems EHR Primer New Participants
Implementation Year	**New Functionality**
Years 4-7 2010 - 2013 Planned	Connectivity to Immunizations Registry Administrative Functions (eligibility verification & claims submission) Clinical Summary Document Exchange Additional Interfaces to EHR Systems Medication Reconciliation Quality Reporting Transitions of Care Radiology Order Entry Patient Portal and PHR Connectivity Enhanced Public Health Connectivity Download Queried Data from DHIN to EMR Receive Allergy and Problem list from EMR New Participants

Consistent with meaningful use requirements, DHIN will be empowering patients by introducing a patient portal that will enable consumers to access their health information, including lab results and medications; receive alerts and notifications, and obtain clinical and hospital discharge summaries at home. As an added benefit, patients will be able to complete a standardized data form at home instead of filling out paperwork on clipboards in the waiting room, which will save time for both the patient and the provider, eliminating the need for manual data entry.

Secure Results Delivery

Traditionally, physicians receive laboratory results and radiology reports by fax, mail, courier, and interoffice mail. Such protocols are often slow and introduce numerous opportunities for

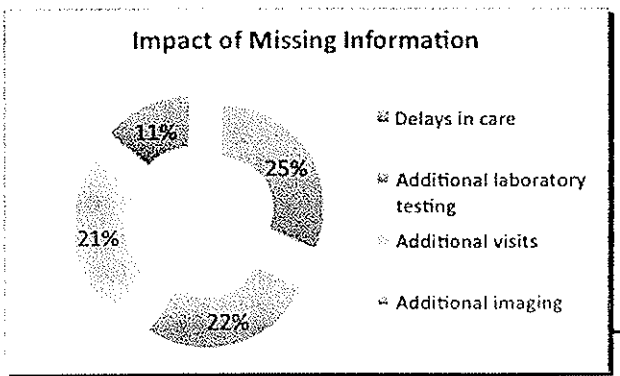
data to be lost or misdirected. In many cases, physicians receive reports from at least five different laboratories, each of which uses a different format and delivery method. DHIN's approach allows for expedited access to information while decreasing the likelihood for error. By providing all clinical reports and results in one standard format regardless of where the test was performed, DHIN eliminates opportunity for misinterpretation of data. The ordering provider knows who performed the test by the logo and contact information presented on the report, while preserving branding and the necessary information for CLIA certified laboratories.

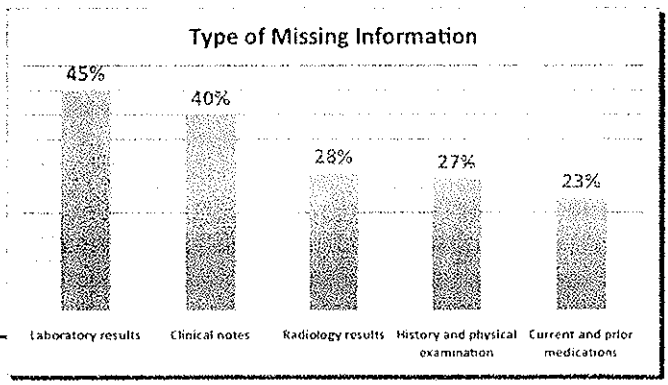
DHIN offers a standardized web-based community health record, which can be customized to the workflow of the practice and job function of the end-user. As a result, authorized users with a need to know can access patient demographic data, payer information, admission discharge and transfer (ADT) data, laboratory and pathology results, radiology reports. Additionally, DHIN connects to the State's public health biosurveillance system for real-time delivery of reportable diseases and emergency chief compliant data. During DHIN's first month of live operation, 800,000 reports were exchanged through the network; now, approximately 40 million transactions are distributed through DHIN monthly, representing more than 81 percent of Delaware's hospital admissions and about 90 percent of outpatient laboratory tests.

Authorized and authenticated users can receive clinical results in three ways: electronic inbox, auto printing, and a direct interface to an existing electronic health record (EHR) system. The electronic inbox provides a secure mailbox for delivering reports and results to ordering physicians and anyone copied on the order, as well as face sheets for office users. Information is accessible in the inbox for 30 days and may be saved, printed, or transferred to another physician for consultation purposes. Reports stored in the inbox can be sorted and configured to the user's preferences. The AutoPrint option sends results directly to a network printer on the basis of the practice's printing preferences (by times of day, hours between print jobs, etc.). Physician practices that choose to receive data via an existing EHR system are set up to connect directly through their EMR vendor, whereby a clinical result can be automatically matched with a patient record and presented to the physician in their EHR worklist.

Patient Record Inquiry

According to the Journal of the American Medical Association (October 2006), missing information at the point of care negatively impacts patient care. As illustrated below, missing results cause delays in care 25% of the time, while additional tests and visits are needed 54% of the time. The types of information that is missing directly relates to that which is mostly provided through the DHIN, by results delivery and patient record search; and includes: lab results, radiology reports, history and physical and medications history.





In June 2009, DHIN upgraded its system to include enhance delivery preferences for users as well as patient record inquiry capabilities. This functionality gives access to authorized providers to search for their patient's available clinical history in DHIN. This history includes all lab, radiology and admission, discharge and transfer data, which has been sent to DHIN since 2007. Additionally, DHIN added two new data senders – Quest Diagnostics and Doctors Pathology Services. Data from these senders is available in the system from their go-live date of June 15, 2009.

The inquiry (search) function is managed through an integrated CMPI and RLS solution Access controls are based upon a provider having previously received a result/report through DHIN on a patient. A provider may "break glass" to expand their access to a patient's information with whom a previous relationship does not exist in DHIN. At which time, the provider must establish a relationship and provide a reason for his/her access to the patient's information. DHIN logs all system activity and at any time, the patient may request an audit report of access to their record through DHIN.

EHR Primer

DHIN will implement many of the State HIE Cooperative Agreement functions through an EHR Primer. The EHR Primer will be offered to practices that do not have an EHR and who cannot afford in the short-term to make the significant financial and staffing/workflow change investment. EHR Primer is slated for go-live during FY10 and will be modular so that providers may adopt the base functionality and then add additional functions as they are ready and able to do so. As such, they can gradually move toward a fully functional EHR without the initial start up costs and significant changes to workflow and productivity. Additionally, if a provider chooses to select another entirely new EHR product after having used the Primer, the data saved for the provider in the Primer can be uplifted to the new EHR as long as that EHR can import the data.

Before rolling the Primer out to community physicians, it must be self-sustaining, which means DHIN must have 200 physicians signed up to use Primer before it can go live. Providers will pay a per provider, per month license fee for the Primer. As such, DHIN is assessing provider interest in purchasing EHR Primer in order to meet the Medicare/Medicaid meaningful use criteria. The DHIN EHR Primer will be certified for its modular services.

The DHIN EHR Primer will have the following base functionality:

Calendar and Scheduling

Scheduling combines patient demographics with preference-based calendar functions that integrate scheduling rules and preferences. The provider and associated care team can view and edit appointments as well as preview schedules and percentage of appointments booked. The following meaningful use objectives are supported with this function:

- Record demographics: preferred language, insurance type, gender, race, and ethnicity.
- Record advance directives
- Record patient preferences (e.g., preferred communication media, advance directive, health care proxies, treatment options)

Chart View
Providers and the associated care team will have the ability to document and view important health information, including, Problem History, Allergy History, Medication History and Immunizations Administration. The following meaningful use objectives are supported with this function:

- Maintain an up-to-date problem list of current and active diagnoses based on ICD-9 or SNOMED.
- Maintain active medication list.
- Maintain active medication allergy list.
- Perform medication reconciliation at relevant encounters and each transition of care

Electronic Prescribing
Providers have the ability to send electronic prescriptions and respond to refill requests. The following meaningful use objectives are supported with this function:

- Use CPOE for all orders.
- Implement drug-drug, drug-allergy, drug-formulary checks.
- Generate and transmit permissible prescriptions electronically (ePrescribing).

Orders Requisition
This function enables providers to create order requisitions, which can be routed electronically through DHIN to the appropriate DHIN-participating lab or hospital. The associated test result will be routed back through DHIN and will match with the order requisition in the providers EHR Primer. The meaningful use objectives supported with this function is the incorporation of lab-test results into EHR as structured data.

Secure Health Messaging
The secure messaging function allows providers and care team within the practice a method to communicate electronically with one another. This includes functionality that resembles an inbox (not to be confused with the DHIN inbox functionality); and users have the ability to send, receive, forward and delete internal messages.

Correspondence
Allows the practice a method to communicate with stakeholders outside of the practice. This functionality includes the ability for the practice to send letters to patients, employers, insurance companies, or other providers, and the capability for automatic mail-merging of demographic and clinical information.

Custom Form Builder
Allows providers and care team a method to collect clinical information on PDF forms generated outside the system. The scanned documents can be utilized to collect clinical information and forms can be generated by the user in order to be made available within the EHR. Patient demographic information auto populates custom forms.

Security Permissions
As an EMR Primer application, security and access controls are managed by the physician practice. Here only patients with direct physician/patient relationships can be viewed bi-directional data exchange is fully supported between the Primer and DHIN. Once data is received by DHIN the access control security functions are invoked. The system controls which users or roles have access to specific information, protecting privacy and securing process execution and sign-off.

The DHIN EHR Primer also will be capable of interfacing with a practices existing Practice Management System as well as support Scanned Document using barcode technology, the system allows the scanning and importation of paper documents directly into patient charts, providing access to complete records.

Electronic Eligibility and Claims Transactions
DHIN plans to support a variety of administrative transactions including eligibility checking and claims submission. Similar to other data aggregation approaches, DHIN offers a flexible implementation model designed to meet data providers at their current level of technology adoption. Therefore, data providers do not have to upgrade their systems in order to participate in the network.

DHIN's approach to administrative transactions intends to achieve the goal of simplifying provider and provider staff interaction with public and private payers across the state of Delaware by optimizing access to administrative transactions, such as eligibility verification and claims submission, by creating a common payer framework where a variety of use types can interact with all payers statewide from a single user interface while maintaining unique payer branding as well as access to "members only" services which will drive adoption of payer-specific online services and information. This framework will be a new paradigm to enable these services to be integrated into the physician's or office staff's workflow, which will streamline process and promote efficiencies. Aggregating payer-related activities streamlines the workflow for physician offices and hospital staff while providing accurate, timely, secure response. Features include:

- Eligibility verification – both batch and real-time transactions are supported
- Benefit Inquiry – verification of coverage, limitations, out of pocket maximums and requirements
- Claims Submission – single or batch processes
- Claims Status Inquiry – verify the status of a claim

Leveraging the technology already provided by the Medicaid Information Technology Architecture (MITA) framework and other health plans, combined with workflow-centric components provided by DHIN can reduce costs while driving adoption of member-specific services provided by the payer.

With regard to providing streamlined administrative processing, DHIN will act in the same manner it does with clinical transactions. That is, DHIN will receive an administrative transaction from multiple data sources including professional and facility claims. This

information will then be transmitted to a selected clearinghouse to process the claim. DHIN plans to release a request for proposals to select the appropriate clearinghouse and to ensure the best rate from the clearinghouse for per-transaction reimbursement to DHIN for facilitating the transactions and the connectivity. With regard to eligibility verification, this will work in tandem with the DHIN query function or can be accessed directly via the office-based electronic medical record, which may be important for meaningful use. A query of a patient's clinical records will also return verification of eligibility for those providers who subscribe to this DHIN service.

Eligibility verification is delivered supporting a combination of physician office workflows including: access to eligibility verification from the query function within DHIN, via the office based electronic medical record, and queried directly to support registration and preauthorization processes. Each workflow is fully supported with a HIPAA compliant web service call where a 270/271 transaction conversation is queried and responded. Additionally, batch verification can be offered to physician offices desiring to leverage their scheduling system and pre-appointment certification.

Electronic Prescribing and Refill Requests

DHIN will provide electronic transmission of prescription and prescription related information (prescriptions, refills) through the EHR Primer to facilitate ePrescribing between a prescriber, dispenser, pharmacy benefit manager, and or health plan through the intermediary Sure Scripts-RxHub. Core features of the prescription writer include medications which are searchable by trade or generic name, diagnosis, and/or therapeutic category (Medication database is supported by Micromedex®). A commonly prescribed or favorites list can be configured by the provider. All prescribed medications and/or refills will include dosage forms and strengths available, route, frequency, duration and quantity. Number of refills, dispense as written, prescribe PRN (as needed), directions and free text comments can be included in the prescription. All prescriptions include the prescriber signature. In addition, formulary and eligibility information are available to providers real time during the e-Prescribing workflow. Clinical decision support is available via a drug reference guide (Micromedex®). Because the e-Prescriber is fully integrated with the EHR Primer, up to date medications histories as well as patient specific clinical information can be accessed during the e-Prescribing process for provision of clinical decision support. Alerts relative to drug interactions, allergies, pregnancy/lactation warnings, lab interactions, condition contraindications, age specific warnings, general precautions and duplication checking is available. Prescriptions can be generated in print form or can be faxed directly to an identified pharmacy (search function for pharmacies by state zip code), they can be transmitted electronically via Sure Scripts EDI (bi-directionally), and/or via an intermediary (health information exchange). The electronic prescriber adheres to all standards; description standards (e.g. NDC), transmission standards (e.g. NCPDP) and associated information standards (e.g. 270/271 eligibility).

Electronic Clinical Laboratory Ordering and Results Delivery

Orders requisition will be an available function offered by the DHIN EHR Primer as well as through a traditional EHR connected with a bi-directional interface with DHIN. For the EHR Primer, providers will have the ability to create order requisitions which can be printed or faxed to a desired performing department. Providers can configure and create a favorites list of orders. Orders for performing departments include laboratory, radiology and clinician orders. Lab order

requisition information includes test name, lab name, test code, lab code. Lab orders can be linked to a specific problem/ICD9 code. Clinical laboratory results can be accepted in to the EHR Primer via DHIN. Full EHR functionality will include electronic delivery of orders. For providers who have an EHR with a bi-directional interface to DHIN, they will have the ability to leverage existing order entry functionality in the EHR, and have that order electronically transmitted to the performing laboratory. The performing laboratory will deliver the ordered test(s) via DHIN, with the appropriate order and result matching occurring in the EHR.

Electronic Public Health Reporting
In 2008, DHIN went live with reporting of chief complaint data from hospital emergency departments (ED) to the State's public health biosurveillance system – the Delaware Electronic Reporting and Surveillance System (DERSS). This functionality also was demonstrated at the NHIN Forum in December 2008 as part of the biosurveillance use case. Via the emergency department admission (ADT transaction), DHIN receives the chief complaint for the patients visit to the ED and routes it to the patients provider as well as to the DERSS system in real-time standardized format. Public Health pseudonominizes the data and imports it into the DERSS system nightly in batch.

DHIN is currently in test with DERSS on lab reporting from hospitals for reportable diseases. This works much the same as the ED chief complaint data feed to public health; however, only lab results flagged by the laboratory's interface is delivered to DERSS.

Quality Reporting
The DHIN quality initiative is built on the strong foundation laid over the last several years. Starting with comprehensive data acquisition services, DHIN receives 40 million transactions per year and contains nearly 650,000 unique patient records (for perspective, Delaware's population is 875,000.) In 2010, DHIN will be working with Delaware's Federally Quality Health Center HIT network (Delaware Health Net) to realize a grant that was recently awarded. The project will establish an interface to the FQHC network of three health centers in order for DHIN to receive problem lists, medications and allergies from the EHR. Additionally, as EHR adoption and meaningful use criteria are realized, DHIN will add other EHR vendors as data contributors to the network. This vast amount of patient records, clinical results and uniquely identified physicians is an essential foundation for a strong quality reporting environment.

This year DHIN will leverage the foundational data stores by providing quality of care reports and analytic tools. Quality reports include the ability to generate reports and distribute information to key stakeholders including physicians and physician groups, de-identified reports to health plans and hospitals, and population reports to public health.

Quality reports can be stratified by gender, age, health plan, ethnicity and include:

1. % diabetic with A1c under control and % diabetic with A1c out of control
2. % Patients with LDL under control
3. % eligible surgical patients who received VTE prophylaxis
4. % order for medications, lab test,
5. % of medications entered (ordered) as generic when a generic equivalent is available
6. 30 day readmission rate

7. Gap in care reports based on practice guidelines (patients with CHF not currently on an ace inhibitor)
8. % reportable lab results submitted electronically
9. Report up-to-date childhood immunization rates
10. Active Health Care Considerations

In addition the quality reports which can be published regularly to targeted physicians and physician groups, DHIN will provide a module available to authorized users supporting the ability to notify, track, and to act on the quality outliers. Using an Internet based tool, users can generate patient lists with key identifiers, and initiate follow-up care. Additionally, this feedback loop allows the ordering physician to identify patients that should either be "excluded" from the population (e.g. a snow bird patient that has returned to their primary care physician) and to add patients that had been wrongly excluded. This process of patient list management, follow-up notification and tracking, and refining PCP responsibility builds accuracy and credibility into the process.

In 2010, DHIN will begin a pilot project with Active Health to support the delivery of Care Considerations to DHIN providers. These reports will be sent to DHIN by Active Health whereby DHIN will deliver the information to the intended provider(s). The pilot project will be the first step toward clinical decision support activities and will include a subset of the Medicaid population managed by Medicaid managed care organization Delaware Physicians Care, Inc. Finally, providing a mechanism to account for quality improvement, DHIN can deliver pay for performance, physician utilization, HEDIS data, and population trends.

DHIN currently facilitates electronic reporting of chief complaint data from hospital emergency department admissions to the Delaware Division of Public Health's biosurveillance system via a web-services interface. Testing is underway for reporting laboratory notifiable-disease results to the biosurveillance system. All chief complaint and applicable laboratory results are delivered to a public health queue in real-time. The Division of Public Health takes a nightly batch feed into the biosurveillance system. This process creates significant efficiencies for both public health and the DHIN-participating hospitals.

Prescription Fill Status and/or Medication Fill History

Delaware is able to offer a unique value proposition - to quickly distribute comprehensive, state-wide medication history data by way of the DHIN HIE platform and Community Health Record. This solution provides the added benefit of storing medication history in Medicity's DataStage technology, affording participating stakeholders early and comprehensive availability of commercial and retail medication data while ensuring its end users experience exceptional response time when making inquiries to the system, and reducing the dependence on a fee-based query each time a DHIN patient is brought into focus via the Community Health Record. DHIN can provide access to medication data for approximately 90 percent of the 'covered lives,' in the Delaware area as part of the implementation. DHIN aggregates the medication history data from these current sources: SureScripts, Pharmacies and PMBs and will ultimately include Medicaid and Medicare.

Additionally, given that more than 75 percent of Medicaid recipients in Delaware are covered by managed care organizations – Aetna Health, Inc. and United Healthcare Insurance Co. – it is important to note that these medications will be available prior to the MMIS integration since these companies already provide data to the DHIN medication history. Other participating health plans include: Blue Cross Blue Shield of Delaware, Inc., National Union Fire Insurance of Pittsburgh, Coventry Health Care of Delaware, American Home Assurance, PacifiCare Life & Health Insurance, Optimum Choice, Hartford Life & Accident Insurance, Metropolitan Life Insurance, AIG Life Insurance, Aetna Life Insurance, Hartford Life Insurance, AmeriHealth HMO, Inc., and Humana Insurance

DHIN also will provide medication reconciliation support in order to assist users in meeting meaningful use criteria. Medication reconciliation empowers clinicians to move from transcription to more clinically relevant reconciliation of medications across the continuum of care. Medication reconciliation provides the ability to (1) utilize an up to date view of a patient's prior medication history using actual fill and refill information; (2) analyze the data to check for drug interactions, duplicate therapy and potential non-compliance; and (3) create a printed or electronic home medication report to serve as the foundation for subsequent patient interviews.

Clinical Summary Exchange for Care Coordination and Patient Engagement

DHIN has been an active participant in the NHIN cooperative since 2007 helping shape many of the technical & security standards like psuedonymization, technical messaging and security frameworks and subject discovery. DHIN will continue to look for opportunities to shape technical specifications, implement them and move those services into Production. Per the meaningful use criteria for HIEs, DHIN will offer certified EMR Primers to physicians in the ambulatory care setting to drive patient safety, and drive improved care coordination through the exchange of summary-of-care records during the transition of care. Please reference the illustration below to gain a better understand of the breadth and reach of our transition of care use cases implemented/planned and how they map to meaningful use objectives. As standards evolve for consumer empowerment and personally controlled health records, DHIN will be prepared to implement using NHIN-approved standards.

All electronic transitions will be implemented using NHIN approved technical messaging standards like CCD formatted transactions (C32), HIE integration profiles such as ATNA, ITI technical framework version 2, and interoperability capabilities to support certified applications to name a few.

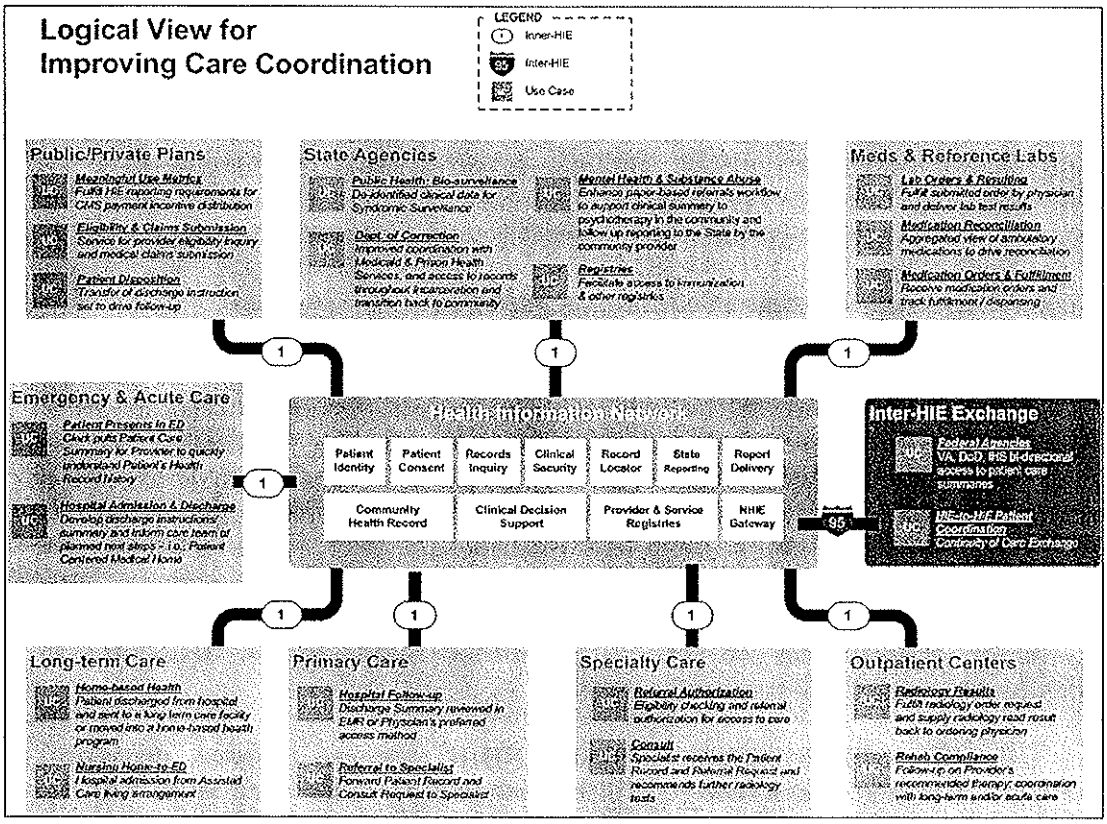
Furthermore, DHIN will be ready to serve as the metrics collection vehicle for CMS incentive tracking and funds distribution for meaningful use given its strategic network connections.

Additionally over 600,000 patients are managed across multiple organizations within the State's Community Master Patient Index, allowing for a composite view of the health record across multiple care locations.

The illustration below (Improving Care Coordination) depicts how DHIN will leverage Core Services to meet established use cases for improving care coordination within the HIE. DHIN's Core Services are designed to:

1. Allow secure, roll-based access to clinical data;
2. Initiate or receive requests to exchange clinical summary documents or discrete results to external consumers, or community physicians
3. Facilitate the ordering and referral requests from community physicians;
4. Provide timely reporting and document exchange to State Agencies.

In addition to these use cases, DHIN offers a secure, audited community health record and patient inquiry capability to all authorized physicians and emergency departments state-wide.



Coordination with Other Programs

Epidemiology and Laboratory Capacity Cooperative Agreement Program

DPH has completed a proof of concept using Orion's Rhapsody integration engine as the data mapping tool with PHIN-MS as the communicator for the reporting of lead and tuberculosis data. DPH sees great potential in using Rhapsody as a data mapping tool to begin communication of other key data sources within DPH. The ELC grant currently funds the Rhapsody License for DPH. The DHIN and DPH will work over the coming year to determine the potential for using the DHIN to integrate data from the Laboratory Information Management System (LIMS) to DERSS; from the State drinking water system to the State LIMS and establishing interoperability efforts to deliver results to ordering providers in the community as well as other facilities and providers, such as those in support of the newborn screening program.

Assistance for Integrating the Long-Term Care Population into State Grants to Promote Health IT Implementation

DPH's three Long Term Care (LTC) facilities are represented on the DHIN Continuum of Care Workgroup. Access to clinical information in DHIN among DPH long-term care providers is being assessed for access rights and workflow. Additionally, DPH is starting the requirements analysis to implement an Electronic Health Record (EHR) System. This system will encompass the Division's three Long Term Care (LTC) facilities as well as all clinic and programs that are responsible for clinical and population health. The data from an EHR will be crucial to patient care within DPH LTC facilities. Connectivity of this EHR to DHIN will afford DPH users immediate access to clinical information on their patients. Additionally, availing DPH clinical information to other DHIN users will be an asset to ensuring continuity of care statewide. DPH will need to seek funding sources to implement this system across the Division, throughout the State and with DHIN. The limited funding available in the Statewide HIE Cooperative Agreement will not support these activities.

HIV Care Grant Program Part B States/Territories Formula and Supplemental Awards/AIDS Drug Assistance Program Formula and Supplemental Awards

The Ryan White system is currently exchanging electronic prescription data with Walgreens, Rite Aid, and Christiana Care. This data is processed through Ryan White and is used for invoicing. This could eventually be incorporated with e-Prescribing components planned for the DHIN and billing and financial modules needed for many programs within DPH. The DHIN and DPH will work collaboratively to define requirements and opportunities for coordination of these efforts through DHIN.

Health Systems Management

In Delaware, the Maternal and Child Health State Systems Development Initiative program and the State Offices of Rural Health Policy and Primary Care are all under the Bureau of Health Planning and Resources Management. These programs support initiatives to address the needs of underserved populations in Delaware by improving the quality and quantity of services and recruiting providers to health professional shortage areas. These programs also work closely with the State Loan Repayment Program (SLRP) (managed by the Delaware Health Care Commission) as well as oversee the J-1 Visa Waiver Program. This program requires that the waiver recipient practice in an underserved area, participate in Medicaid and State Children Health Insurance Program (S-CHIP) and provide charity care. Recipients of the SLRP must also practice in an underserved area and certify that they will provide health care services to Medicare, Medicaid, and uninsured patients.

Additionally, all of the State's Federally Qualified Health Centers are connected to DHIN through their electronic health records systems. They also are represented on DHIN committees, as is the Director of the Bureau of Health Planning and Resources Management.

Every other year, the Bureau of Health Planning and Resources Management commissions a report on provider capacity in Delaware, completed by the University of Delaware. The

University surveys healthcare providers to get an understanding of their practice locations, insurance and uncompensated care accepted, their use of technology and other practice patterns that affect access to quality, affordable healthcare. As such, DHIN is a beneficiary of this report in helping to better understand the technical capabilities of provider practices and their interest in participating in DHIN. This is an important tool for DHIN and also will help establish meaningful users based on survey feedback coupled with DHIN data and will help complete the provider directory for Delaware.

State Mental Health Data Infrastructure Grants for Quality Improvement

The Delaware Department of Health and Social Services' Division of Substance Abuse and Mental Health (DSAMH) is the single state agency responsible for administering mental health, substance abuse and gambling prevention and treatment services in Delaware. The following components make up the Division:

- **Central Office** -- Responsible for the planning and administration of statewide substance abuse services and mental health services for adults 18 years of age and older.
- **Delaware Psychiatric Center (DPC)** – DPC is the state's only state run psychiatric hospital and operates three discrete programs: a long-term psychiatric hospital, a forensic program, and a psychiatric Long Term Care (LTC) nursing facility.
- **Crisis Services** -- Provides 24/7 crisis intervention services including mobile intervention, crisis phone intervention, collaboration with police and hospital emergency room staff in managing crisis interventions, etc. The goal of the mobile crisis approach is to assist in ameliorating a psychiatric crisis.
- **Substance Abuse Services** -- DSAMH operates, directly or through contracts with private agencies, primary prevention and treatment services throughout the state. Treatment services include outpatient evaluation and counseling, methadone maintenance, case management services (including intensive multi-disciplinary teams), short and long term residential programs, residential detoxification services, the Treatment Access Center (TAC) which provides targeted services and liaison with the Courts and criminal justice system, and services directed toward problem/compulsive gambling
- **Community Support Program Structure for Adults** -- DSAMH has developed a statewide system of four community support programs known as Community Continuum of Care Programs (CCCP). Each program is dedicated to meeting the multiple needs of adults with severe and persistent mental illness. These programs serve between 250 and 480 individuals and operate with a high degree of resource control and clinical autonomy. Services delivered via a team approach are tailored to the individual's needs and are designed to be flexible as the person's needs change. The CCCPs are based on several evidence-based practices including the Program of Assertive Community Treatment model, Co-occurring Treatment Approach, Supportive Employment models and medication treatment algorithms. Four Community Mental Health Clinics located throughout the state provide outpatient mental health treatment services. Services include short-term counseling, psychiatric and supportive counseling, crisis intervention, limited case management, and medication administration and monitoring. There are three day-programs operating in Delaware which provide facility-based rehabilitative services in a group format. There are nineteen 24-four hour supervised group residences in Delaware, and each is organized as a self-contained program ranging in capacity from five to ten residents.

Clinical Care Information System (CCIS)
The Division of Substance Abuse and Mental Health is in the process of implementing a clinical care information system (CCIS). The system is comprised of the following functionality -- enrollment & eligibility, admissions & registration, client scheduling, client assessment, Minimum Data Set (MDS) for long-term care patients, treatment planning, clinical documentation, pharmacy and laboratory interface, therapy and rehabilitation, physician order entry, charge capture, care management, case management, work flow management, and results reporting. The CCIS system includes the capability to import key data (client admissions, discharges, status changes, etc.) collected by DSAMH's contracted providers into the "core" system. The goal for the CCIS system is to provide a seamless tool for both clinical and administrative staff.

Outcomes Measurement/Performance Measurement
It is expected that CCIS will be able to support Delaware's compliance with national and state initiatives. DSAMH manages several grants and contracts with federal agencies. These grants and contracts are either infrastructure development initiatives or mechanisms to submit data directly to the federal government's contractors. When fully operational, CCIS will be able to generate JCAHO/ORYX performance measures and will be TEDS/NOMS/SOMMS compliant, based on specifications developed by the Center for Substance Abuse Treatment (CSAT) and the Center for Mental Health Services (CMHS). Several key initiatives for DSAMH are the Mental Health Statistics Improvement Program (MHSIP), the Uniform Reporting System (URS), the Treatment Episode Data Set (TEDS), and other initiatives under the Drug and Alcohol Services Information System (DASIS). The current priority for the Substance Abuse and Mental Health Services Administration (SAMHSA) is the National Outcome Measures or (NOMS). As a top priority of SAMHSA, the NOMS have been driving the federal agenda for performance measurement for several years. While mental health and substance abuse treatment share the same performance domains, the performance measures for both are different. In addition, CCIS will provide decision support tools to bring "Best Practices" and "Evidence-based Practices" to the point of care. CCIS is expected to enhance outcome monitoring, assessment and reporting as an EBP. Examples include the "Kansas Consumer Survey" and the "Quality of Life Assessment".

Delaware Health Information Network (DHIN)
A goal for the Clinical Care Information System is to fully integrate with DHIN. The CCIS system uses standard data formats (including HL7, XML, CSV, and fixed-record layout) for integration with other software and external databases. It is expected that DSAMH's CCIS system will be another node on DHIN, receiving clinical results from DHIN providers and providing clinical updates to DHIN practitioner participants. The goal for CCIS is to create a comprehensive electronic health information platform and allow this information to be available when and where needed to improve care delivery. In addition, having up-to-date clinical information from multiple sources will help DSAMH meet its performance and quality outcomes.

In addition, the CCIS, when fully operational, desires connectivity with the following programs and providers, some or all of which can be accomplished via DHIN connectivity:

- Medicaid Management Information System (MMIS) -- DSAMH staff use the prior authorization module of the MMIS to authorize care for clients using higher levels of care.
- Quest Diagnostics Incorporated
- LabCorp (Laboratory Corporation of America)
- Redwood Toxicology Laboratory
- DSAMH Inpatient Pharmacy
- DSAMH Outpatient Pharmacy

Child Mental Health Services
In addition to DSAMH, whose focus in on services for adults 18 years and older, the Division of Child Mental Health Services (DCMHS) serves the needs of minors. A pilot between DHIN and DCMHS and its mental health/substance abuse treatment providers will replace current, manual processes, which can result in delays in treatment. Service Plan information is currently received primarily via paper forms and the data is currently summarized in a word document pulled from various sources and systems. This information is used to advise the designated provider of the background and treatment needs of the patient. The plan and service authorization is then faxed to the community provider. Connectivity to DHIN will afford DCMHS the ability to send a CCD to the referred to provider in order to facility the patients treatment.

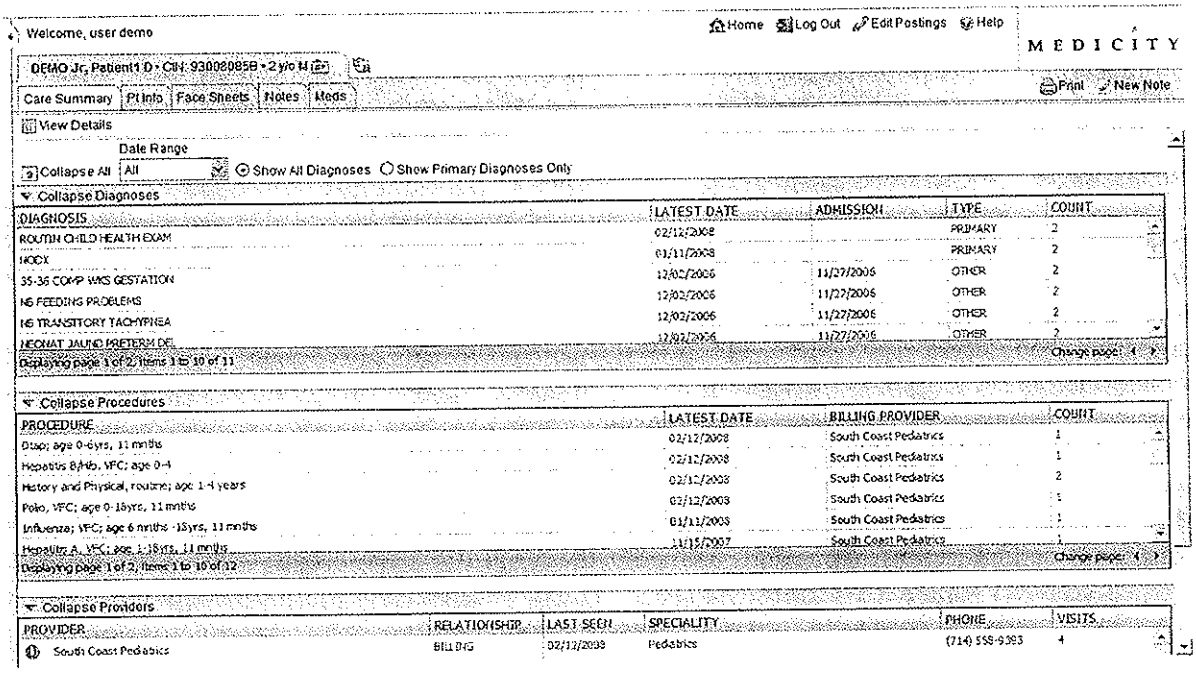
Medicaid and the Children's Health Insurance Program (CHIP)

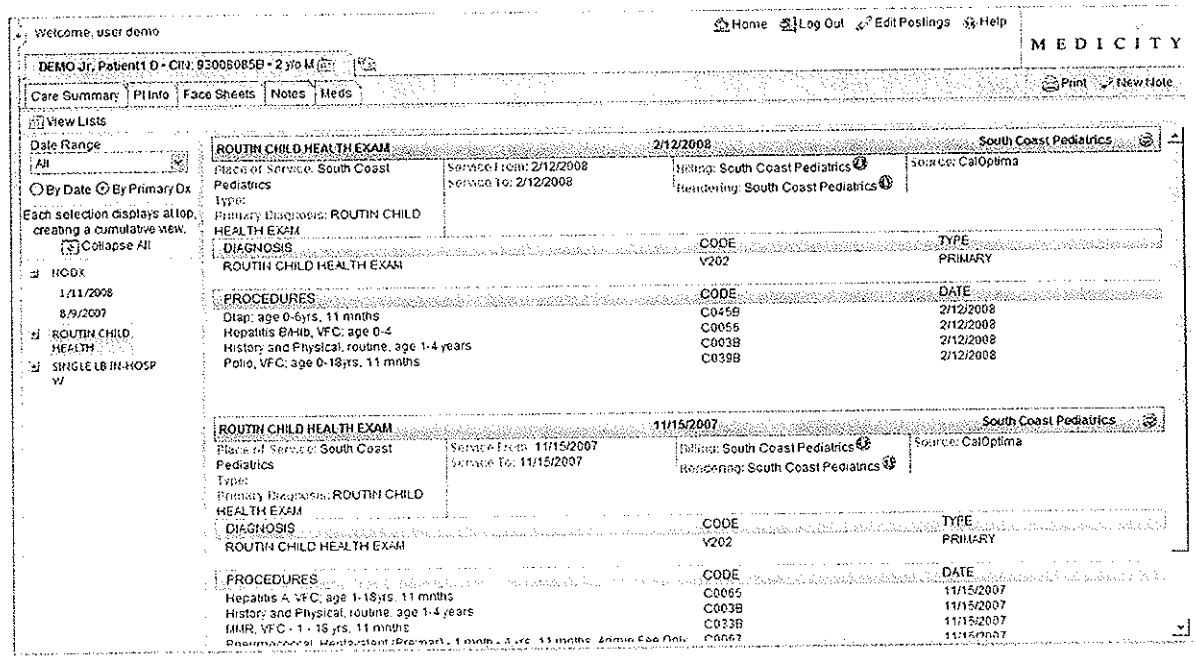
The Division of Medicaid and Medical Assistance (DMMA) has primary responsibility for administering the Medicaid and CHIP programs. DMMA and DHIN continue to collaborate on approaches to connectivity which support improved care management, improved communication with Medicaid providers and efficiencies in prescription drug management. DMMA implemented an ePrescribing Program funded through a CMS Medicaid Transformation grant, in November 2008. It is anticipated that this program will be transitioned to be supported by DHIN.

Medicaid is preparing to develop the Delaware Medicaid HIT Plan. This effort will be completed in collaboration with DHIN leadership to ensure that the HIE can be leveraged to its full capacity in supporting Medicaid's HIT plans. This collaboration will ensure that HIE investments by the State and the federal government are maximized and economies of scale are realized throughout implementation of the Medicaid HIT plan.

Connection of the Delaware MMIS to DHIN will provide statewide access to authorized practitioners to enable them to view summarized Medicaid claims data. This, in turn, provides the practitioner with medical history, chronic care conditions, current and past medications, and the patient's care team. Combining claims data with the robust clinical results (such as lab tests) currently available to DHIN users are expected to dramatically improve patient safety, reduce duplicate test ordering and prevent patients from misusing the health care system (whether drug seeking or lack of appropriate follow-up care to the Medical Home).

DHIN architecture supports a confederated model where data from Medicaid will be stored in a dedicated, secured environment.





Eligibility Verification

Even though automated eligibility verification is currently available through Medicaid's fiscal agent, EDS, connectivity with the MMIS through the DHIN will enable its vast network of physicians to verify Medicaid eligibility for their clients through the same system with which they access medical information. Dates of coverage, Medical Home status, Plan Coverage, and

other key details are easily viewed, printed, and navigated. DHIN supports both a 270/271 real time process, as well as batch file distribution where the exchange of eligibility data occurs according to a predetermined schedule. Aggregated within commercial payers, adoption is enhanced due to the elimination of multiple sites to navigate, consolidation of user name/passwords, and the availability of multiple payers.

Directories
Leveraging state licensing databases, DHIN and Medicaid can partner to provide access to shared directories. These directories can include providers, practice locations, health plan participation, and service providers. These directory services will provide not only enhanced user adoption but will lay the foundation necessary to support state reporting and accounting of physician compliance with meaningful use criteria.

Measuring Meaningful Use Compliance
DHIN is uniquely positioned to help Medicaid document the compliance of health care professionals and acute care hospitals with the meaningful use criteria as articulated in the American Recovery and Reinvestment Act (ARRA). As "meaningful use" becomes fully defined these data points might change but today DHIN has visibility into:

- Physicians using a certified EMR
- Electronic exchange of information
- e-prescribing and medication history
- CPOE adoption

As meaningful use criteria become more stringent in 2015, DHIN objectives and corresponding reporting will continue to evolve accordingly.

Shared MPI (Master Patient Index)
The Department of Health and Social Services (DHSS) has implemented and maintains a state Master Client Index (MCI) which assigns a unique identifier to each client of the department, including Medicaid recipients.. This identifier is created during the process of applying for benefits from multiple state agencies and is retained by recipients throughout their contact with DHSS programs. Once the MCI is created, it is shared with other program systems within and outside of DHSS. Among the agencies sharing MCI data are: DMMA/DSS, Public Health (clinics, immunizations, lab services, etc.), Division of Child Support, Division of Substance Abuse and Mental Health and the Department of Services for Children, Youth and Families. Each program database maintains its own set of member demographics such as name, home address, mailing address, phone number etc. Updates entered into the registration database are not necessarily distributed to the program systems and vice versa.

Although this unique MCI works well for DHSS programs, the DHIN community master patient index (CMPI) can be leveraged to extend its capabilities and create bi-directional interfaces to interact more accurately with program systems. As DMMA becomes a "data sender" into the DHIN, a data staging environment will be created. From this environment CMPI logic will be implemented, supporting unique matching rules for each program. DHIN will utilize the MCI code which will add value to the process by leveraging demographic and other identifiers from these program systems. This will aid programs that might need to add member information prior

to receiving the MCI number, as is the case with the newborn screening program. In this case, a DHIN CMPI code will be assigned first, prior to the assignment of an MCI number. Once the MCI number is assigned and received by DHIN, the CMPI rules will match the program data with the MCI data to create a single record. DHIN can broadcast the MCI number along with any program data back to the program system. This reconciliation process eliminates the need for manual intervention from either the registration process or the newborn screening program.

DHIN further adds value with the CMPI logic. Designed to support a single patient from multiple disparate healthcare systems, the CMPI allows for communication, distribution, and patient query regardless of duplication in sender data. From this community view, various programs can access patient demographics, clinical results, immunization status, and other key data elements. Additionally, physicians and other healthcare providers with authorized access to patient data in DHIN can also view this data for the patient. As more and more information is received, the benefits of this aggregation and reconciliation process become exponential. Any information communicated back to either the Medicaid program or a program system will include both the MCI number and any program identifier needed within those systems for matching.

Coordination with Other Federally Funded and ARRA Programs

Immunizations Registry

In 2008, DHIN began discussions with the Delaware Division of Public Health (DPH) on connecting the State's immunizations registry with DHIN. This discussion was put on hold while DHIN worked with State information technology leaders to establish a plan for participation in the DHIN by all state agencies. These discussions were completed in September 2009 at which time DHIN resumed discussions with DPH on connecting the registry and reporting immunization administration to DPH. This process will continue as a full set of scope requirements are defined; at which time implementation will begin on connecting the DHIN with the immunization registry for by-directional electronic reporting through the DHIN.

Providers who subscribe to the DHIN EHR Primer will have the ability to electronically document immunization administration. Immunization, series number, due date, date of actual administration, administration site, lot number, expiry date, manufacturer name, comments, CPT, and ICD9 can be recorded. Immunization entries identify the provider/caregiver administering the immunization. Childhood and Adolescent Immunization schedules can be generated and printed; record includes patient demographics, immunization and date of administration. Once DHIN connectivity to the Immunization Registry is complete, immunization management in the EHR Primer will be automatically routed to DPH for reporting.

Regional Extension Centers

Quality Insights of Delaware (QID) is Delaware's invited applicant for the Regional Extension Center grant program. QID administered the DOQ-IT program in Delaware and was extremely successful in helping Delaware providers implement EHR systems as a result; they are a logical candidate to implement the extension center. QID has been a strong and active proponent of

DHIN for many years and currently works collaboratively with DHIN, under contract, to support physician practices with interfacing their electronic health records with DHIN.

DHIN and QID have a long history of working together – the Chief Operating Officer of QID was an active member of the committee that reviewed vendor responses to the technical RFP, took part in the vendor demonstrations and subsequent vendor selection. QID will enable targeted Delaware hospitals and many physician practices to implement HIT and, in conjunction with DHIN, meet the "meaningful use" standards.

State Loan Repayment Program

The Delaware State Loan Repayment Program (SLRP) is designed to recruit primary care, dental and mental health professionals to provider shortage areas throughout the state. The program is co-managed by the Delaware Health Care Commission (DHCC) and Delaware Higher Education Commission (DHEC). Participating clinicians provide health services in an underserved area for a minimum of two and maximum of four years in exchange for payments toward their educational loans. Since the program's inception in 2001, nine dentists, thirty-one physicians, three certified nurse midwives and three certified nurse practitioners have been placed in underserved areas of the state. In collaboration with the DHCC/DHEC, the SLRP program guidelines could be revised to promote the use of EHR and require connectivity with DHIN among participating health care providers.

Institutions of Higher Education

Delaware does not have an institute of higher medical education within the state; however it has a long-standing relationship with two schools in nearby Philadelphia, Pennsylvania. The Delaware Institute of Medical Education and Research (DIMER) was created in 1969 by the Delaware General Assembly as a cost effective alternative to establishing a medical school in Delaware. DIMER provides enhanced opportunities for Delaware residents to obtain medical education by providing financial support to Thomas Jefferson University's Medical College and Philadelphia College of Osteopathic Medicine in exchange for reserved admission slots for qualified Delawareans. Scholarships and tuition supplements are also available for participating students. DIMER's relationship with these institutions has facilitated and enhanced collaboration on health-related initiatives in Delaware.

In March 2009, a new coalition of leading education, healthcare and medical research institutions, the Delaware Health Sciences Alliance, was announced. The partners include Thomas Jefferson University, University of Delaware, Christiana Care Health System, and Nemours / A.I. DuPont Hospital, whose common priorities are world-class healthcare education; interdisciplinary "bench-to-bedside" research; and better healthcare quality and delivery. Their goal is to improve health and health services to all Delawareans through the nurturing of research and the development of advanced technology. Through the Alliance, major research centers are being considered in the areas of cardiovascular disease, cancer, women's and children's health, neuroscience and health policy. DHIN has had preliminary discussions with the Alliance to discuss the potential cache of de-identified patient data DHIN will have available through its data mart. DHIN will continue to play a role in the growth and development of this new and exciting opportunity in Delaware.

Broadband

The Delaware School and Public Anchor Institutions Connect project fills gaps in State's Broadband network left from Delaware's previous broadband initiatives. If awarded, funds from this grant will extend the state network deeper into specific community anchor institutions including schools, libraries and social service agencies making computers, Internet, and video conferencing available to the public. While this initiative is focused on enhancing broadband access for educational purposes, it will inherently support expanded access to the DHIN. About 12 percent of Delaware providers indicated that they have dial-up or no access to the Internet. As such, expanding the broadband network to these areas will ensure that these providers have access to broadband, which is the only significant requirement for connectivity to the DHIN.

The Delaware Department of Technology and Information (DTI) implemented a project of similar size and scope in partnership with Verizon Communications in 2001. This project laid down the infrastructure necessary to bring broadband services to 200 of the state's 238 public education institutions within three years and cost $14.9 million. About $12 million of the $14.9 million or 80.5 percent was donated by Verizon and the remaining $2.9 million or 19.5 percent was paid for by the State.

Research

Christiana Care Health System and the University of Delaware have applied for an NIH Challenge Grant Program (10-HL-101). The purpose of the grant is to develop data sharing and analytic approaches to obtain from large-scale observational data, especially those derived from electronic health records, reliable estimates of comparative treatment effects and outcomes of cardiovascular, lung, and blood diseases. Advances in this area will address two important barriers to research on comparative treatment effects:

- Inability to link data across disparate data platforms and health care settings
- Inability to address confounding and on-treatment biases in observational studies based on data from clinical practice.

The first could be addressed by creating an interoperable electronic health record (EHR)-based research platform that assures privacy and confidentiality while allowing questions to be addressed that could not be by using data from only one clinical practice, health plan, or health system; the second by developing new methods to address confounding when attempting to use observational data to compare treatment effects, e.g., instrumental variables, innovative quasi-experimental designs, facilitating ecologic analyses of clinical data using linkages of geographic and clinical data. Such approaches would increase the credibility and value of observational analyses of huge integrated EHR databases in identifying optimal treatment practices for cardiovascular, lung, and blood diseases with multiple available treatment options. Delaware is uniquely positioned to study these factors due to the widespread implementation and rich data sets of the DHIN.

Data Sharing at Regional and Nationwide Level

DHIN has had a long-standing commitment to move beyond State borders at such time it has achieved critical mass within the State of Delaware. With great progress having been made toward achieving 100 percent hospital connectivity and having a steep rise in physician practices using the system, DHIN is in a position to begin looking at opportunities to connect with neighboring states. Additionally, DHIN has participated in the NHIN since 2007 and looks forward to production connectivity with the Federal NHIN partners.

Regional Data Sharing

The concept of a regional health information exchange (HIE) serving the Mid-Atlantic states is currently under discussion with several states in the region.

Most notably, the States of Delaware, Maryland and Pennsylvania see a significant proportion of patients crossing state lines for health care. For example, patients in Delaware are referred to hospitals in Philadelphia and Baltimore for specialty care and specialized trauma services. Residents of Maryland and Pennsylvania frequent Delaware beaches, casinos, shops and restaurants and when in Delaware may need to seek emergent care. This is exemplified by the significant increase in emergency visits to beach-area facilities during the summer months.

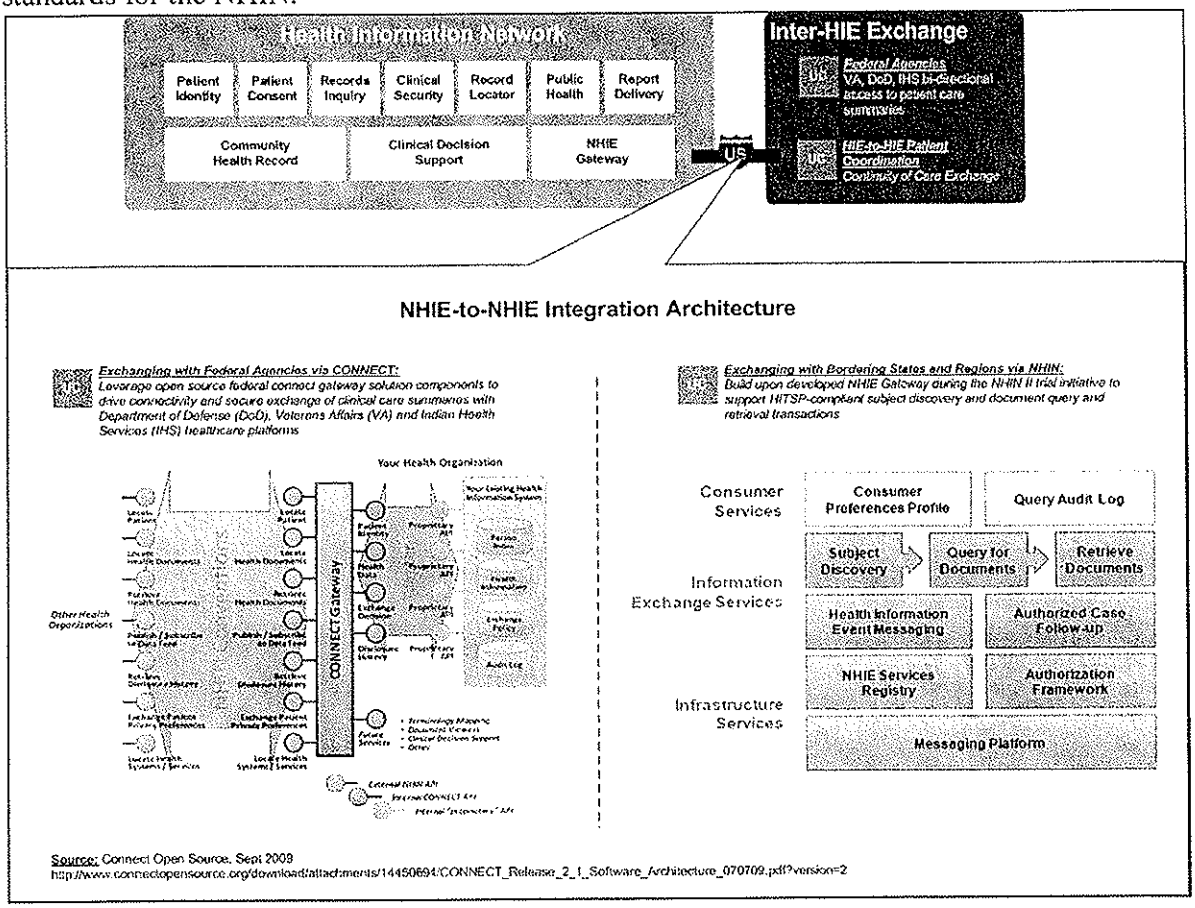
Additionally, many patients live in one state, work in another state and seek health care in one or more states. As a result, the Chesapeake Regional Health Information Exchange for our Patients (CRISP), who was recently awarded a contract by the Maryland Health Care Commission to become the Statewide HIE as well as the Pennsylvania Governor's Office of Health Care Reform have been in discussions with Delaware regarding opportunities to leverage the DHIN's infrastructure to provide reduced cost and speed to market for implementation of their respective HIEs. This avenue is one option they may pursue in the development of their statewide health information exchanges.

Nationwide Data Sharing

DHIN was selected as one of nine health information exchanges to participate in the Nationwide Health Information Network (NHIN) Trial Implementation project led by the Office of the National Coordinator for Health Information Technology. DHIN was a contract award winner and active participant in the development of NHIE gateway specifications and implementation or core services / bio-surveillance use case during the second trial demonstration. Among the long list of accomplishments, a key one was being the first to connect to the Federal partners during trial implementation in 2008.

As part of the trial implementations, DHIN demonstrated patient preferences, subject discovery, query, retrieval and display of a summary record, lab results distribution, and biosurveillance reporting. DHIN has subsequently been awarded an option year contract to continue participation in the NHIN, whereby work toward production connectivity with the Federal CONNECT Gateway planned to support clinical exchange with the Veterans Administration, Department of Defense, and Indian Health Service where applicable.

The diagram below illustrates DHINs technical integration architecture with Federal partners via the Federal CONNECT Gateway as well as connecting with other HIEs and RHIOs using federal standards for the NHIN.



DHIN has committed to continue participation and conformance to all nationally defined standards for inter-HIE clinical data exchange. Below are examples of some of the standards implemented during the 2008 trials:

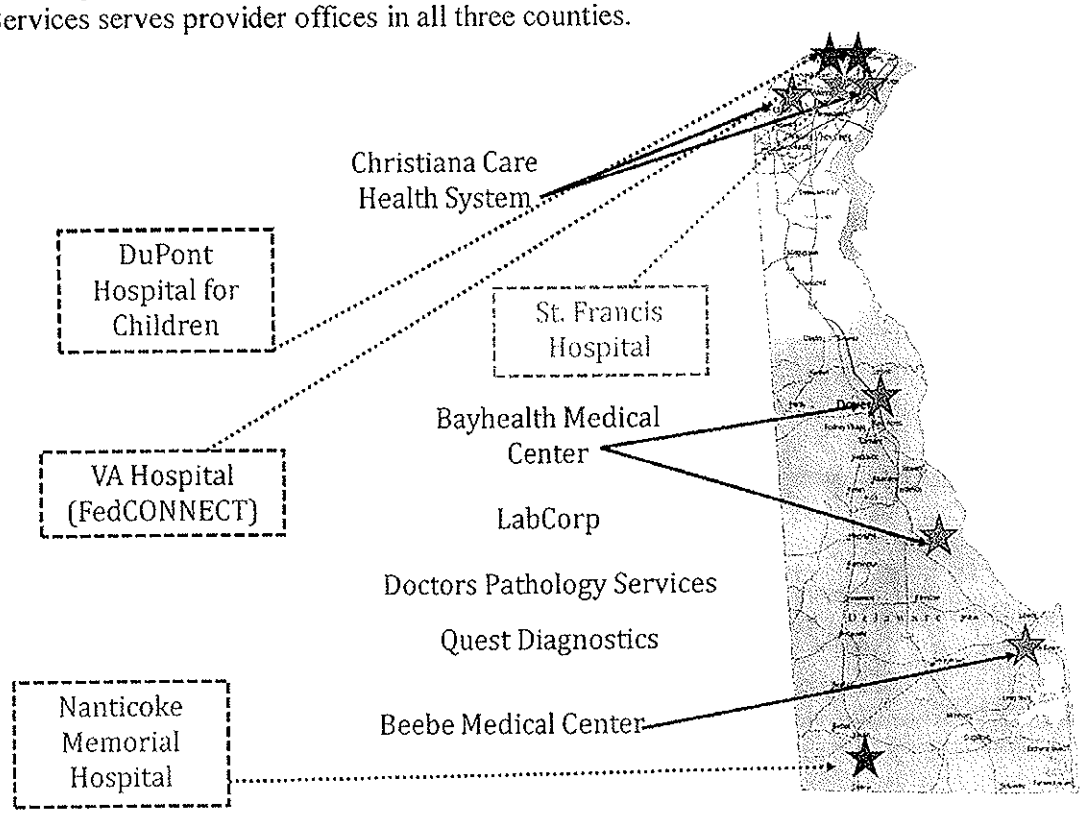
- Subject Discovery – PIX, PDQ, XDS.b, etc.
- ATNA Logging
- Technical Messaging
- Pseudonymization
- DURSA
- Content

DHIN passed all core service use cases during the summer of 2008, and demonstrated bio-surveillance use case in December of 2008.

Business and Technical Operations

Implementation

The following map depicts the current service area of the DHIN. Those organizations listed in black are fully interoperable with DHIN. Those labeled in green are in the implementation process and those in blue are discussions with DHIN for connectivity. It is important to note that LabCorp and Quest Diagnostics have patient service sites statewide and Doctors Pathology Services serves provider offices in all three counties.



While DHIN is focused on connecting all healthcare providers within the State of Delaware, there is a great deal of interest in moving beyond State boundaries. DHIN is currently discussing opportunities for connectivity with healthcare providers in Delaware's healthcare service area Maryland and Pennsylvania. This effort may be through the NHIN or via direct connections to the primary hospitals and labs in this area and enrollment of community physicians.

During the first two years of operation (May 2007 to May 2008) DHIN has focused on building the data available through the system and the functionality to support physician users (secure results delivery and patient record inquiry). Enrollment into the DHIN has been through word of mouth and presentations made to audiences of physicians and their office staffs. Through these efforts, DHIN has enrolled more than 50 percent of practicing providers in the State.

On June 15, 2009, DHIN implemented a version upgrade of the system which added flexibility for results delivery options as well as the patient record inquiry function to include clinical results and medication history.

This marketing effort will include multiple methodologies:

- Visits made to physician practices
- Follow up on referrals received from DHIN participating practices
- Exhibits and presentations at medical/user focused conferences, seminars and events
- Guest articles in clinical/medical publications/newsletters/journals
- Promotional items that keep the DHIN name in the medical-public domain
- Education/Training of the provider relations, sales and physician outreach staff at health plans, reference labs and hospitals.

In addition, DHIN will collaborate with participating hospitals, labs, health plans and public health agencies to promote the use of DHIN and provide incentives for enrollment.

Communication to consumers also is important. DHIN is currently working with a marketing firm and its consumer advisory committee to develop consumer-directed communications regarding DHIN participation and benefits.

Shared Services

DHIN's focus has been on providing those functions that enhance the ability of providers within the state to obtain unparalleled access to patient data but also to share data beyond the functional capabilities of the organizations involved. In order to accomplish this DHIN offers its participants a set of core services that will be expanded over time.

Initial Core Services

- Community Master Patient Index
- Record Locator Service
- Identity management
- Data distribution
  - Autoprint
  - EMR delivery
- Public health reporting
- Security audit
- Vocabulary services
- Ambulatory medication

Future Services

- EMR Lite/Primer
- ePrescribing
- Federal institution connectivity
- Patient consent management
- Payer connectivity
  - Eligibility
  - Referral authorization
  - Claims summary
- Referral management
- Quality indicator reporting
- Order routing from EMRs

The core services offered by DHIN will continue to be evaluated and extended with stakeholder feedback.

Meaningful Use

DHIN has worked with its users and participants to assess their needs in terms of meeting meaningful use criteria. In order to enhance DHINs value and ensure that physicians and hospitals that participate in DHIN are able to leverage DHIN to meet meaningful use criteria, DHIN does or will provide the following services in support of its participants. Those items

marked with a (*) denote functionality that has already been implemented; an (^) indicates functionality currently in the implementation process.

- Electronic Order Entry^
- Incorporate Lab Results into EHRs as structured data*
- Maintain an Active Medication List^
- Perform Medication Reconciliation
- Implement Drug-Allergy, Drug Formulary, Drug-Drug Interactions
- Standards-Based Transactions*
- Electronic Insurance Eligibility Verification
- Electronic Claims Submission
- Maintain an up-to-date "problem list" of current and active diagnoses based on ICD-9 and SNOMED
- Record Demographic Data (preferred language, insurance type, gender, race and ethnicity)*
- Quality Reporting - generate List of patients by specific conditions for outreach and quality improvement
- Patient Access to Electronic Information
  - Provide Access to Patient-Specific Education Resources
  - Send Reminders to Patients for Preventative and Follow-Up Care
- Exchange Key Clinical Information*
  - Clinical Summary
- Public Health Reporting
  - Immunization Registry
  - Electronic Syndromic Surveillance*
- Proof of Compliance with HIPAA Privacy and Security Rules*

Legal and Policy

Privacy and Security

As set forth in the DHIN Statute, DHIN shall by rule or regulation ensure that patient specific health information be disclosed only in accordance with the patient's consent or best interest to those having a need to know. The health information and data of the DHIN is not subject to the Freedom of Information Act, Chapter 100 of Title 29, nor to subpoena by any court. Such information may only be disclosed by consent of the patient or in accordance with the Delaware Health Care Commission's rules, regulations or orders.

Any violation of the Commission's rules or regulations regarding access or misuse of the DHIN health information or data shall be reported to the office of the Attorney General, and subject to prosecution and penalties under the Delaware Criminal Code or federal law. (71 Del. Laws, c. 177, § 1.)

With the assistance of DHIN's hospitals, privacy officers, legal counsel and Consumer Advisory Committee, DHIN has established a policy that considers individuals' rights and expectations,

while balancing the need for health care providers to have information that enables them to make informed decisions and ultimately provide better quality health care services.

DHIN's Access to Individually Identifiable Health Information Policy is applicable to all users and data contributing organizations of DHIN. All users, senders and receivers of data, have signed and agreed to the DHIN Data Use Agreement. This policy does not supersede or replace any Health Insurance Portability and Accountability Act (HIPAA) privacy or security policies in use by individual DHIN users and data contributing organizations.

As an entity of the State, DHIN receives legal counsel and opinions from the Attorney General's office. Opinions have included privacy and security policies (including mental health data), governance structure options, as well as contracts and business associate agreements.

DHIN adheres to all of the privacy principles articulated in the DHHS Privacy and Security Framework:

Openness and Transparency Principle

There should be openness and transparency about policies, procedures, and technologies that directly affect individuals and/or their individually identifiable health information.
As an entity of the State, DHIN is required to permit access to its public records, including policies, procedures, and technologies, in accordance with the law and as that term is defined in Delaware Code Title 29, Chapter 100 Freedom of Information Act. All of DHIN's policies regarding privacy and security are posted on DHIN's public website.

All participating DHIN data contributing organizations' Notice of Privacy Practices have been reviewed and are inclusive of electronic health information exchange. This applies to the delivery and query of information through DHIN for the purposes of treatment, payment or operations/administrative actions.

Correction Principle

Individuals should be provided with a timely means to dispute the accuracy or integrity of their individually identifiable health information, and to have erroneous information corrected or to have a dispute documented if their requests are denied.

In accordance with HIPAA, individuals are provided the means to challenge and amend their individually identifiable health information. Requests to amend data shall be made directly to the data contributing organizations; DHIN does not have the authority or access to amend individually identifiable health information.

Individual Choice Principle

Individuals should be provided a reasonable opportunity and capability to make informed decisions about the collection, use, and disclosure of their individually identifiable health information.

Individuals may decide not to participate in DHIN. Non-participation results in personally identifiable health information not being available to users (including emergency personnel) upon a query or expanded query. Individuals may choose to be reinstated in the system again at any time with no penalty. DHIN has developed specific procedures to process non-participation requests, as well as requests to begin participating again.

Individuals are provided the means and opportunity to request an audit report that identifies which DHIN user(s) has accessed their individually identifiable health information through DHIN. Audit reports will not contain any personal health information. DHIN has established specific procedures to respond to requests for audit reports in a timely manner.

Consistent with meaningful use requirements, DHIN will be further empowering individuals by introducing a patient portal that will enable consumers to access their health information, including lab results and medications; receive alerts and notifications, and obtain clinical and hospital discharge summaries at home.

Collection, Use and Disclosure Limitation Principle

Individually identifiable health information should be collected, used, and/or disclosed only to the extent necessary to accomplish a specified purpose(s) and never to discriminate inappropriately.

Only users enrolled in DHIN who have an established relationship with a patient will have access to that patient's information available through DHIN. Emergency care personnel will have access to DHIN whereby they can access patient records in emergency care situations on a need to know basis.

Users may expand their access to patient information by requesting to establish a relationship with a patient in DHIN. Users are required to log a reason for the relationship and set a defined time period for access, not to exceed six (6) months.

DHIN patient/consumer information is not sold or disclosed for any activity that may support marketing to the individual nor is individual information provided and/or used for mailing lists.

Safeguards Principle

Individually identifiable health information should be protected with reasonable administrative, technical, and physical safeguards to ensure its confidentiality, integrity, and availability and to prevent unauthorized or inappropriate access, use, or disclosure.
Access rights in DHIN are based on user roles and job responsibilities. Users are granted access to information on a need to know basis. That is, users may only receive access to the minimum functions and privileges required for performing their jobs. Users are required to acknowledge and accept the DHIN Terms and Conditions of Use prior to logging into the application. DHIN has adopted procedures to suspend or terminate a user's access to the system in the event misuse is identified. Pre-emptive efforts are also made by DHIN's implementation and training teams to educate users to adhere to privacy regulations; and the consequences of misuse are strongly emphasized.

All disclosures of individually identifiable health information through DHIN and the use of such information obtained from users of DHIN are consistent with all applicable federal and state laws and regulations and shall not be used for any unlawful discriminatory purpose. Violations of privacy are subject to immediate termination of access to DHIN up to and including legal action in accordance with DHIN's privacy policy and with all applicable federal and state laws and regulations. Pursuant to the DHIN Statute, inappropriate access is a criminal offense that could be subject to prosecution by the State of Delaware as a Class D felony punishable by eight (8) years imprisonment, fines and penalties for each offense.

Accountability Principle

The Principles in the Privacy and Security Framework should be implemented, and adherence assured, through appropriate monitoring and other means and methods should be in place to report and mitigate non-adherence and breaches.

DHIN logs all system activity, including: user log-in identification, user name, user organization, date and time, patient account that was accessed, and type of records viewed by user. DHIN monitors access to individually identifiable health information on a regular and scheduled basis to ensure appropriate use of the system. In consultation with the State's High Tech Crime Unit, procedures have been developed to report and address misuse and/or breaches of the system.

State Laws

In 1997, DHIN was created by statute (Delaware Code Title 16, Part XI, Chapter 99, Subchapter IV) to be a public instrumentality of the State of Delaware to promote the design, implementation, operation and maintenance of facilities for public and private use of health care information. The DHIN statute establishes that inappropriate access of the system is a criminal offense that could be subject to prosecution by the State of Delaware as a Class D felony punishable by eight (8) years imprisonment, fines and penalties for each offense. There are no plans at the current time to modify the state laws that created DHIN and provide protections from liability.

Policies and Procedures

DHIN was created by statute, which defines its governance as well as provides liability protections. DHIN has promulgated regulations for participation in the network. Additionally, DHIN has implemented policies, procedures and/or protocols for privacy and security, provider relations and user management, and system monitoring.

With the assistance of DHIN's hospitals, privacy officers, legal counsel and Consumer Advisory Committee, DHIN has established policies and procedures that consider individuals' rights and expectations, while balancing the need for health care providers to have information that enables them to make informed decisions and ultimately provide better quality health care services.

Trust Agreements

The DHIN has in place, business associate agreements with all data sender organizations and electronic health record vendors. Additionally, DHIN requires all users of the system to certify that they have read and agree to the data use agreements. DHIN also provides practice offices

with a security check-list that is encouraged to be initialed and signed by every DHIN user in the practice.

Oversight of Information Exchange and Enforcement

Violations of privacy are subject to immediate termination of access to DHIN up to and including legal action in accordance with DHIN's privacy policy and with all applicable federal and state laws and regulations. Any violation of the DHIN's rules or regulations regarding access or misuse of the DHIN health information or data shall be reported to the office of the Attorney General, and subject to prosecution and penalties under the Delaware Criminal Code or federal law. Pursuant to the DHIN Statute, inappropriate access is a criminal offense that could be subject to prosecution by the State of Delaware as a Class D felony punishable by eight (8) years imprisonment, fines and penalties for each offense. In consultation with the State's High Tech Crime Unit and Attorney General's Office, procedures have been developed to report and address misuse and/or breaches of the system.

Benefits of DHIN

The transparent availability of information, and the incentives and ability to use it, are critical prerequisites for effective, safe, coordinated care. According to a Commonwealth Fund report, U.S. health spending is projected to increase from 16 percent of GDP in 2006 to 20 percent in 2016 – from $2 trillion to $4 trillion.[1] Despite this enormous expenditure, care is either underused (patients do not get recommended care) or overused (patients receive inappropriate care that is of little value or may expose them to harm). Furthermore, missing information has been shown to adversely affect care in 44 percent of clinic visits and delay care in 59 percent of visits.[2] In 2007, Kaelber and Bates reported that 18 percent of patient safety errors and 70 percent of adverse drug events could be potentially eliminated if the right information about the right patient was consistently available at the right time.[3] Nationwide use of a system that incorporates many of the features already in place in DHIN could improve patient safety and clinical outcomes while saving more than $80 billion over 10 years.[1] These savings could be attributed to fewer duplicate tests, shorter hospital stays, and reduced administrative costs.

Funding and Sustainability

Capital Phase

Currently, DHIN is funded but a combination of Federal, State and Private funds. These funds ensure diversity in the funding streams for the DHIN as follows:

Federal Contracts

DHIN's contract with the Office of the National Coordinator has provide funding for DHIN to build functions consistent with the NHIN Trial Implementations core services as well as the laboratory harmonization and biosurveillance use cases. During the current contract year, funding will support work toward production connectivity with Federal CONNECT. In addition to this contract, DHIN has a contract with the Agency for Healthcare Research and Quality for $4.7 million. This contract is now in its fifth and final year.

State Funding

DHIN has received a total of $8.0 million dollars from the State's capital budget over the past four years. This funding is contingent upon dollar for dollar matching funds from the private sector (details below). A final $1.0 million has been requested for State FY11.

Private Funding

DHIN's model for private sector funding during the start-up or capital phase of the project (FY07 to FY10) is based on the premise that those who benefit from DHIN shall share in its financing. Currently, the primary benefits going primarily to hospital and lab participants. These participants, or data senders, pay a proportionate share of the cost based on their transaction volume as well as their own start up costs associated with hardware and interface development. A donation to DHIN has has been provided by Delaware's largest health plan. The private funds are used to draw down State funding on a dollar for dollar match.

Ongoing Operations

As mentioned above, the DHIN is currently in planning stages for its long-term sustainability model. As the DHIN has moved from a results delivery system (or push model) to a patient record inquiry system (or pull model), the beneficiaries of the system have grown to include payers of health care. DHIN has had several meeting and discussions with the major health plans covering Delaware to define a payment structure that will include health plans as well as large, self-insured employers.

The Finance and Sustainability Workgroup is currently evaluating fair and equitable revenue approaches which include all benefitting stakeholder groups. Because the Workgroup includes broad stakeholder representation, all those affected by the financing plan will be part of the decision-making process. By diversifying the fee structure and paying entities, the cost to the data senders will decrease; thus leveling the investment across multiple healthcare sectors. Recommendations for long-term sustainability will be made to the DHIN Board of Directors in December 2009.

The DHIN also is working with the State of Delaware finance representatives to redirect financing from the State's capital budget to its operating budget by showing cost savings and reallocation derived from a more efficient way of doing business for many of their divisions and departments, including: public health, Medicaid, employee benefits, correctional health, and substance abuse and mental health.

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2. Smith PC, et al. (2005). Missing clinical information during primary care visits. *JAMA 293*(5):565–571.

3. Kaelber DC, Bates DW. (2007). Health information exchange and patient safety. *Journal of Biomedical Informatics 40*(6):S40–S45.